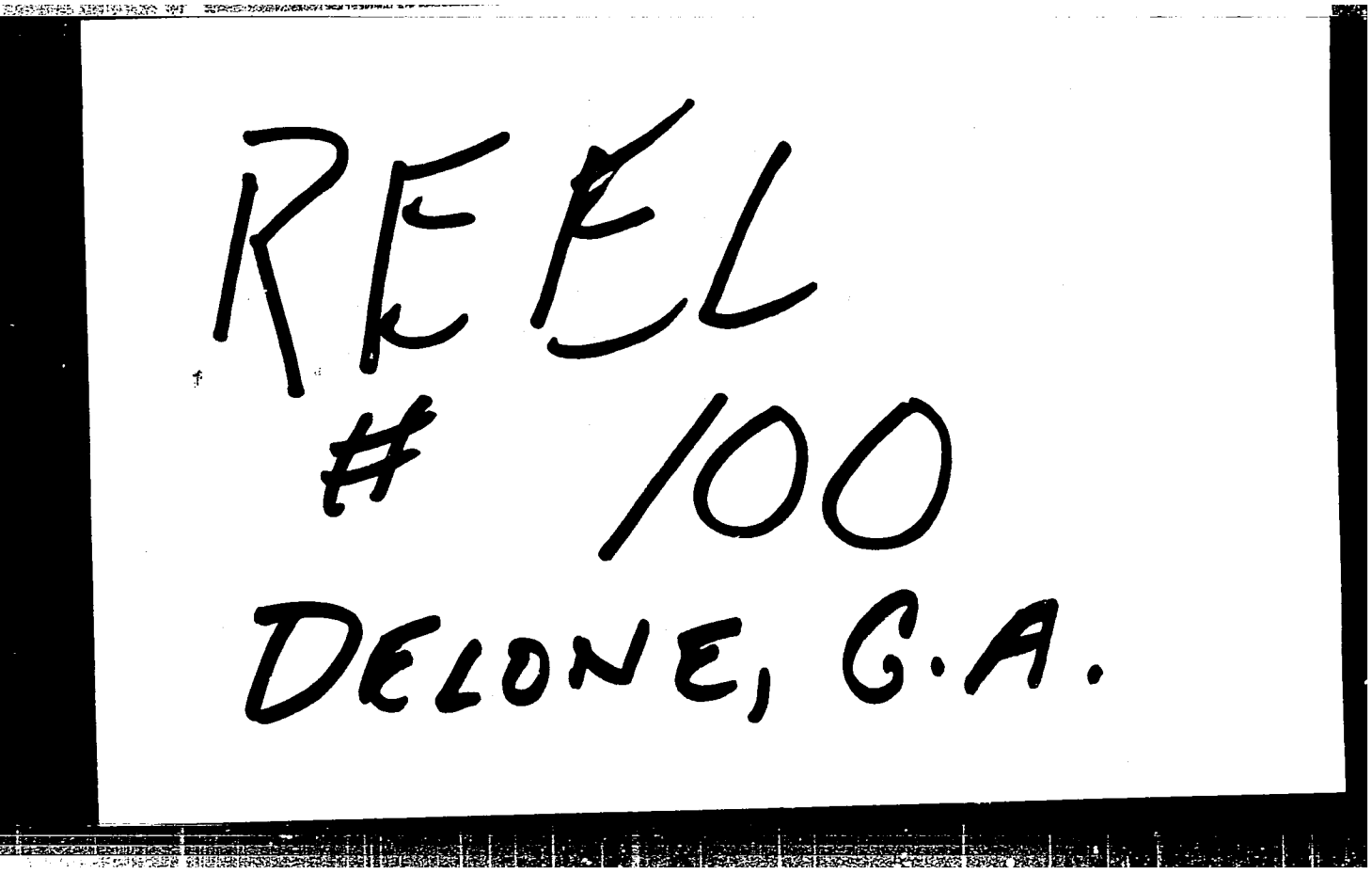

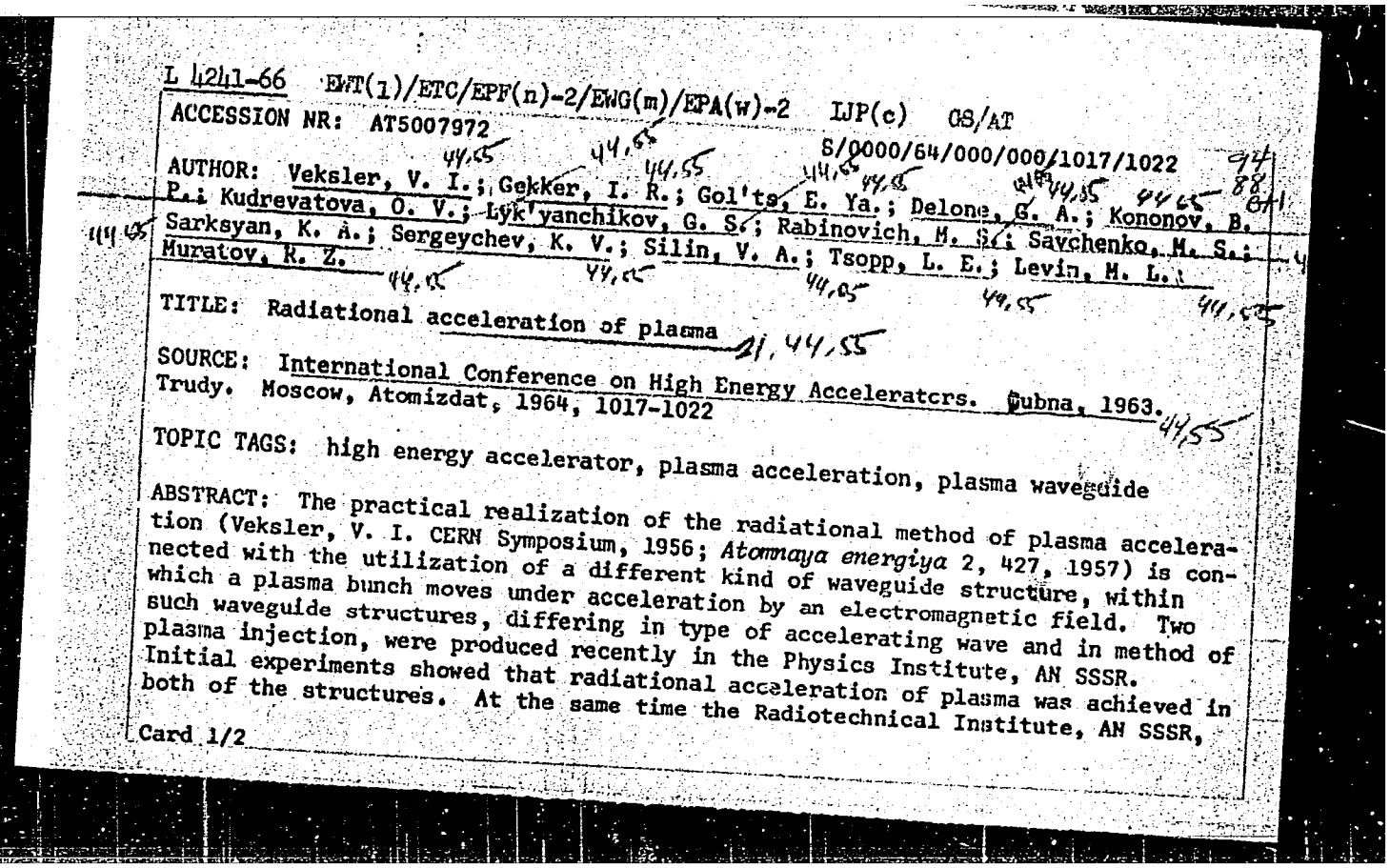

L 4241-66 EWT(1)/ETC/EPF(n)-2/EWG(m)/EPA(w)-2 IJP(c) GS/AT

ACCESSION NR: AT5007972 S/0000/64/000/000/1017/1022

AUTHOR: Veksler, V. I.; Gekker, I. R.; Gol'ts, E. Ya.; Delone, G. A.; Kononov, B. P.; Kudrevatova, O. V.; Lyk'yanchikov, G. S.; Rabinovich, M. S.; Savchenko, M. S.; Sarksyan, K. A.; Sergeychev, K. V.; Silin, V. A.; Tsopp, L. E.; Levin, M. L.; Muratov, R. Z.

TITLE: Radiational acceleration of plasma

SOURCE: International Conference on High Energy Acceleratcrs. Dubna, 1963. Trudy. Moscow, Atomizdat, 1964, 1017-1022

TOPIC TAGS: high energy accelerator, plasma acceleration, plasma waveguide

ABSTRACT: The practical realization of the radiational method of plasma acceleration (Veksler, V. I. CERN Symposium, 1956; *Atomnaya energiya* 2, 427, 1957) is connected with the utilization of a different kind of waveguide structure, within which a plasma bunch moves under acceleration by an electromagnetic field. Two such waveguide structures, differing in type of accelerating wave and in method of plasma injection, were produced recently in the Physics Institute, AN SSSR. Initial experiments showed that radiational acceleration of plasma was achieved in both of the structures. At the same time the Radiotechnical Institute, AN SSSR,

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L 4241-66

ACCESSION NR: AT5007972

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carried out a theoretical study of the possibilities of the radiational method. The present report contains a brief exposition of all these investigations, under the two headings of: experimental results and theory of radiational acceleration. Both waveguide structures employed one and the same super high-frequency oscillator of 10 cm range which operated in the single- stage pulse regime of 8 microseconds duration; the average density of power flux through tube cross-section did not exceed $8 \cdot 10^3$ watts/cm^2, and the KSVN of the entire waveguide system (without plasma) was not worse than 1.3. The accelerating waveguides were tubes of circular cross-section with walls of noncorroding steel 1 mm thick; the vacuum in the tubes was of the order of 10^{-7} to 10^{-6} mm of mercury. The forces of the radiational pressure which act upon the plasma bunch are found by proceeding from the conservation laws. In the plane electromagnetic wave propagated in free space the density of pulse flux equals the average energy density. Orig. art. has: 7 figures, 26 formulas.

ASSOCIATION: Fizicheskiy institut imeni P. N. Lebedeva AN SSSR (Physics Institute, AN SSSR); Radiotekhnicheskiy institut AN SSSR (Radio Engineering Institute, AN SSSR)

SUBMITTED: 26May64 ENCL: 00 SUB CODE: NP,

NO REF SOV: 008 OTHER: 003

BVK

Card 2/2

ACCESSION NR: AP4042927 S/0057/64/034/008/1409/1416

AUTHOR: Delone, G. A.; Savchenko, M. M.

TITLE: Motion of plasmoids in external magnetic fields

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 34, no. 8, 1964, 1409-1416

TOPIC TAGS: moving plasma spread, plasma loss, plasma beam density, plasma beam geometry, plasma beam parameter, plasmoid, plasma gun, plasmoid magnetic interaction

ABSTRACT: In order to reduce spreading and losses of particles by a plasmoid during its motion from the source (a spark-type gun) in magnetic fields of different configurations, and thus obtain plasmoids of small size at large distances from the gun, the parameters (density, and geometry) of a plasmoid during its motion were investigated. Longitudinal, transverse, and quadrupole magnetic fields were used. The experimental apparatus consisted of a glass tube 100 cm long and 8 cm in diameter. One end of the tube was closed by a flange with a plasma gun in it. The tube was evacuated to 1—2 x 10^{-6} mm Hg through the other end, which contained measuring probes. The magnetic

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ACCESSION NR: AP4042927

fields were generated by a system of conductors mounted on the tube, through which a battery of capacitors was discharged. The plasma gun, which produced 1—3 x 10^{15} particles, was similar to the usual spark gun described by W. H. Bostick in the Physical Review, v. 104, no. 2, 292, 1956. The temperature of electrons in the plasma at a distance of 15 cm from the gun was 10 ev. The strength of the longitudinal, transverse, and quadrupole magnetic fields varied from 0 to 5000, from 0 to 1500, and from 0 to 1100 oersteds, respectively. The experiments showed that the form of the plasmoid changed little with distance, and that total losses of particles are small only in a quadrupole magnetic field. In addition, a lack of axial symmetry during motion in a longitudinal magnetic field and strong dependence of the character of motion in a transverse field on the mutual orientation of the field and the current through the gun were observed. The authors express gratitude to E. Ya. Gol'ts for valuable discussions. Orig. art. has: 9 figures.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR, Moscow (Physics Institute, AN SSSR)

Card 2/3

L 6356-66 EPF(c)/EPA(w)-2/EWT(l)/EWT(m)/EWP(i)/T/EWA(m)-2/EWP(e) IJP(c) WH

ACC NR: AP5028018 SOURCE CODE: UR/0386/65/002/008/0377/0380

AUTHOR: Voronov, G. S.; Delone, G. A.; Delone, N. B.; Kudrevatova, O. V.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences, SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Multiphoton ionization of a hydrogen molecule in a strong electric field of ruby laser radiation

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu (Prilozheniye), v. 2, no. 8, 1965, 377-380

TOPIC TAGS: ionization, ion, ionization potential, negative ion, positive ion

ABSTRACT: An investigation was made of the multiphoton ionization of a hydrogen molecule under the effect of ruby laser radiation at an intensity of the electric field of $E \sim 10^7$ v/cm. The ratio between the ionization potential ($I = 15.43$ ev) and the quantum energy ($\hbar\omega = 1.79$ ev) shows that ionization can result from absorption of nine quanta. The following results characterize the multiphoton ionization of a hydrogen molecule. The number of quanta whose absorption probability determines the probability of ionization is $K = 7.67 \pm 0.36$. This number was obtained from the dependence of the number of generated molecular ions N_i on the number of photons N_j which passed through the focusing region. The probability of the multiphoton ionization of a hydrogen molecule resulting in the formation of a molecular ion is

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L 6756-66

ACC NR: AP5028018

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$W = 10^{6.3 \pm 1.5}$ sec^{-1} at a field intensity $E = (1.1 \pm 0.3) \times 10^7$ v/cm (photon flux $F = 10^{30.0 \pm 0.2}$ cm^{-2}·sec^{-1}). A probability of absorption of less than nine quanta determines the probability of ionization of a hydrogen molecule. Calculations based on the theory of multiphoton ionization of atoms when applied to a hydrogen molecule show that the experimentally observed probability $W = 10^{6.3}$ sec^{-1} of an eight-photon process can take place in an electric field with an intensity of $E = 8.5 \times 10^7$ v/cm, which exceeds the experimental value of $E = 1.1 \times 10^7$ v/cm. In a strong field both the molecular ions H_2^+ and the atomic ions H^+ are generated. At a field intensity of $E \geq 1.2 \times 10^7$ v/cm the ratio of the generated ions is $10 \leq N(H_2^+)/N(H^+) \leq 100$. Atomic ions can be generated by dissociating a molecule with the subsequent ionization of neutral atoms or by ionizing a molecule followed by dissociation of a molecular ion. Orig. art. has: 2 figures.

[JA]

SUB CODE: NP/ SUBM DATE: 27Aug65/ ORIG REF: 003/ ATD PRESS: 4143

Card 2/2 RDS

L 23868-65 EWT(1)/EWG(k)/EPA(sp)-2/EPA(w)-2/EEC(t)/T/EEC(b)-2/EWA(m)-2
Pz-6/Po-4/Pab-12/Pi-4 IJP(c) JM/AT

ACCESSION NR: AP5003998 S/0089/65/018/001/0014/0018 B

AUTHOR: Veksler, V. I.; Gekker, I. R.; Golts, E. Ya; Delone, G. A.; Kononov, B.P.; Kudrevatova, G. V.; Luk'yanchikov, G. S.; Rabinovich, M.S. Savchenko, M.M.; Sarksyan, K. A.; Sergeychev, K. F.; Silin, V. A.; Tsopp, L. E.

TITLE: Interaction of plasma bunches with an electromagnetic wave 21

SOURCE: Atomnaya energiya, v. 18, no. 1, 1965, 14-18

TOPIC TAGS: plasma clot, plasma clot acceleration, plasma clot radiative acceleration, H sub 01 wave, H sub 11 wave

ABSTRACT: Preliminary experimental results are given of an investigation of the radiative acceleration of plasma in circular waveguides. The investigation was conducted in a 10-cm range with H_{01} and H_{11} waves. Different plasma injectors were used. Plasma bunches with an initial particle concentration of 10^{12} cm^{-3} and higher were injected with a 5 x 10^6 cm/sec velocity from a spark source or were generated directly on the axis of the waveguide by means of a plasma source at a pressure drop of 10^{-7}—10^{-6} mm Hg of the operating vacuum in an accelerator. Electric detectors, superhigh-frequency methods, and an electrostatic analyzer of particle energy were used for the investiga-

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ACCESSION NR: AP5003998

tion. External magnetic fields with various configurations were used to confine the plasma. Accelerated ions with energies exceeding 10 kev were obtained regardless of the type of wave in the waveguide or the kind of plasma injector. The energy of the accelerated ions increased as the superhigh-frequency power increased. The total number of accelerated particles was of the order of 10^{12}. Maximum energy was 50 kev. The application of nonhomogeneous fields for the stabilization of the transverse dimensions of plasma bunches was shown to be feasible. There were practically no plasma losses on the waveguide walls when quadrupole or sextupole magnetic fields were used. Orig. art. has: 7 figures. [JA]

ASSOCIATION: none

SUBMITTED: 22Apr64 ENCL: 00 SUB CODE: ME,EM

NO REF SOV: 008 OTHER: 001 ATD PRESS: 3178

Card 2/2

L 30390-66 EEC(k)-2/EWP(k)/EWT(l)/EWT(m)/FBD/T/EWP(t)/ETI IJP(c) AT/WH/WG/JD
ACC NR: AP6020794 SOURCE CODE: UR/0386/66/003/012/0480/0483

AUTHOR: Voronov, G. S.; Delone, G. A.; Delone, N. B.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences, SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Multiphoton ionization of krypton and argon by ruby laser radiation

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 12, 1966, 480-483

TOPIC TAGS: krypton, argon, xenon, laser application, gas ionization, ionization cross section, RUBY LASER, LASER RADIATION, ELECTRIC FIELD

ABSTRACT: The authors observed multiphoton ionization of krypton and argon atoms by ruby-laser radiation at an electric field intensity ~10^7 v/cm, and compared the ratios of the ion signals of krypton and argon with those of xenon, for which measurements of the ionization probability were made by them earlier (ZhETF v. 50, 78, 1966). The experimental setup was similar to that previously used for observation of the multiphoton ionization of xenon (also reported in Pis'ma ZhETF v. 1, no. 2, 42, 1965) and the hydrogen molecule (ibid. v. 2, 377, 1965). The measurements were made at pressures 10^{-5} - 10^{-4} mm Hg. The produced ions were

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L 30390-66
ACC NR: AP6020794

analyzed with a time-of-flight spectrometer and registered with an electron multiplier. The multiphoton ionization probability ratios obtained from the experimental ratios were found to be $10^{-0.87 \pm 0.1}$ and $10^{-2.06 \pm 0.5}$ for Kr/Xe and Ar/Xe respectively, as against $10^{-0.83 \pm 0.1}$ and $10^{-2.37 \pm 0.3}$ obtained for the ratio of the ion signals. The results are compared with the predictions of the theory of L. V. Keldysh (ZhETF v. 47, 1945, 1964) and with the perturbation-theory calculations of A. Gold and B. Bebb (Phys. Rev. Lett. v. 14, 60, 1965 and Phys. Rev., in press) and the differences in the results are discussed. The authors thank A. A. Grachev, S. A. Ob"yedkov, and V. P. Solov'yev for help, and L. V. Keldysh and M. S. Rabinovich for valuable discussions. Orig. art. has: 3 formulas and 1 table. [02]

SUB CODE: 20/ SUBM DATE: 15Apr66/ ORIG REF: 005/ OTH REF: 003/
ATD PRESS: 5017

Card 2/2 CC

L 10408-67 EWT(1) : IJP(c) AT

ACC NR: AT6033037 SOURCE CODE: UR/2504/66/032/000/0080/0088

AUTHOR: Delone, G. A.; Savchenko, M. M. 39 38

ORG: none

TITLE: Characteristics of the motion of a plasma cluster in longitudinal, transverse, and two dimensional multipolar magnetic fields

SOURCE: AN SSSR. Fizicheskiy institut. Trudy, v. 32, 1966. Fizika plazmy (Plasma physics), 80-88

TOPIC TAGS: plasma beam, longitudinal magnetic field, transverse magnetic field

ABSTRACT: In the experiments, motion of the plasma clusters was created in a glass tube with an inside diameter of 7.7 cm and a length of 100 cm (see Fig. 1). A spark-type plasma gun 1 was fastened to a flange covering one end of the tube; the other end of the tube was connected to a fitting which had a lateral opening for evacuation 4. Measuring electric probes 3 were inserted through the end of the fitting. The work was done at a vacuum of $(1-2) \times 10^{-6}$ mm Hg. The magnitude of the longitudinal magnetic field was measured from zero to 5000 oersteds, and the magnitude of the transverse magnetic field was varied from zero to 1500 oersteds. It was observed that the configuration of the plasma cluster depends on the direction of the magnetic moment of the flow "loop" at the gun, with respect to the vector of the transverse

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L 10408-67

ACC NR: AT6033037

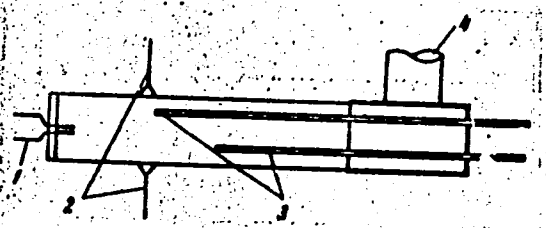

Fig. 1. Scheme of unit
1—gun; 2—superhigh frequency antennas;
3—electrostatic screened probes; 4—to pump.

magnetic field. The article then passes on to a mathematical consideration of the more complicated case of two dimensional multipolar magnetic fields. It was found experimentally that supply of a negative voltage to the electrode (approximately 500 volts) practically did not change the amount of plasma transported. However, if a positive voltage of the same magnitude is supplied to the electrode the amount of plasma passing through the electrode is decreased by one order of magnitude. "In conclusion the authors thank V. B. Studenov for his aid in the work." Orig. art. has: 10 figures.

SUB CODE: 20/ SUBM DATE: none/ ORIG REF: 003/ OTH REF: 002

Card 2/2

ACC NR: AP7003207 SOURCE CODE: UR/0056/66/051/006/1660/1664

AUTHOR: Voronov, G. S.; Delone, G. A.; Delone, N. B.

ORG: Physics Institute im. P. N. Lebedev of the Academy of Sciences SSSR

TITLE: Multiphoton ionization of atoms. II. Ionization of krypton by means of ruby laser emission

SOURCE: Zh eksper i teor fiz, v. 51, no. 6, 1966, 1660-1664

TOPIC TAGS: gas ionization, ruby laser, laser application

ABSTRACT: An experimental investigation was made of the multiphoton ionization of the krypton atom (J = 13.996 ev) with the aid of ruby laser emission ($\hbar\omega$ = 1.785 ev). The ionization probability and the dependence of the probability on the photon flux was measured for $F \gtrsim 10^{31}$ $cm^{-2} \cdot sec^{-1}$, which corresponds to an electric field strength of $E \sim 3 \times 10^7$ v/cm. The emission of a powerful laser was focused on a vacuum chamber filled with krypton at a pressure of 10^{-4} mm Hg when the mean free path ($\sim$40 cm) and the time between the collisions ($\sim 10^{-3}$ sec) were several orders larger than the size of the focusing region ($\sim 10^{-2}$ cm) and the duration of the pulse emission ($\sim 10^{-8}$ sec). Thus, the ionization was the result of the direct effect of emission on the separate atoms. The mean free path of electrons with an energy of $\sim$1 ev in the plasma with a density of $\sim 10^{12}$ cm^{-3},

Card 1/2 UDC: none

ACC NR: AP7003207

generated in the focusing region (assuming 100 percent ionization) was 1 cm. This was much greater than the size of the focusing region ($\sim 10^{-2}$ cm), demonstrating that in the ionization region no electron-ion collisions were present. The dependence of the ionization probability on the photon flux was found to be $K \approx \langle J/\hbar\omega + 1 \rangle - 2$. The ionization probability observed experimentally was higher than the calculated probability of the transitions in the virtual levels of the continuous spectrum. This apparently is linked with the contribution of the transitions in the bound states. The comparison of the experimental and theoretical results indicates that transitions in the bound states contribute appreciably to the ionization probability and that the effect of the radiation field on these states is considerable. The authors thank V. Berezkin, A. A. Grachev, and S. A. Ob'yedkov for their help in the experiment and Professors L. V. Keldysh and M. S. Rabinovich for discussing the results. Orig. art. has: 1 figure and 2 tables.

SUB CODE: 20/ SUBM DATE: 14Jul66/ ORIG REF: 006/ OTH REF: 003/
ATD PRESS: 5113

Card 2/2

L 31715-66 GW

ACC NR. AP6021184 SOURCE CODE: CZ/0023/66/010/001/0015/0023

AUTHOR: Delong, Borivoj

50
B

ORG: Geodetic Research Institute, Prague

TITLE: Possibilities of more accurate determination of physical reductions by means of zenith distances

SOURCE: Studia geophysica et geodaetica, v. 10, no. 1, 1966, 15-23

TOPIC TAGS: geodesy, distance measuring equipment, applied mathematics, optic range finder

12

ABSTRACT: The article presents a mathematical derivation of a variant of the method of simultaneous double observations of zenith distances with an optical range finder and an evaluation of the results of its practical testing. Orig. art. has: 1 figure, 13 formulas and 3 tables. [JPRS]

SUB CODE: 08, 20 / SUBM DATE: 18Jun65 / ORIG REF: 003 / OTH REF: 001

Card 1/1 hd

DELONE, I. O.

USSR/Chemical Technology. Chemical Products and Their Application -- Treatment of natural gases and petroleum. Motor fuels. Lubricants; I-13

Abst Journal: Referat Zhur - Khimiya, No 2, 1957, 5527

Author: Sergiyenko, S. R., Delone, I. O., Davydov, B. E.

Institution: Academy of Sciences Azerbaydzhan SSR

Title: Removal of Tarry Substances From Diesel Fuels by the Method of Adsorption Chromatography

Original Publication: Tr. Vses. soveshch. po khimii i pererabotke nefti (18-24 sen. 1951). Baku, izd. AN AzSSR, 1953, 80-90

Abstract: No abstract

Card 1/1

SERGIYENKO, S.R.; DELONE, I.O.; DAVYDOV, B.E.; TETERINA, M.P.

Composition andproperties of the bituminous portion of Nori petroleum. Report 1. Trudy Inst.nefti 4:18-30 '54. (MLRA 8:1)
(Nori--Bitumen)

SERGIYENKO, S.R.; DAVYDOV, B.E.; DELONE, I.O.; TETERINA, M.P.

[Composition and properties of high molecular petroleum compounds] Sostav i svoistva vysokomolekuliarnykh soedinenii nefti; doklady na IV Mezhdunarodnom neftianom kongresse v Rime. Moskva, Izd-vo Akad.nauk SSSR, 1955. 57 p. (MLRA 8:9)
(Petroleum)

DELONE, I. O.

"Investigating the Composition and Properties of Tars From Devonian Petroleums of the Second Baku." Cand Chem Sci, Inst of Petroleum, Acad Sci, USSR, Moscow, 1955. (KL, No 13, Mar 55)

So: Sum. No 670, 29 Sept 55 - Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (15)

Delone, I. O.

SERGIYENKO, S.R.; DELONE, I.O.; DAVYDOV, B.E.; TERTERINA, M.P.

Analysis of the composition and properties of the part of petroleum having a high molecular weight. Trudy Inst. nefti no.6:71-78 '55.
(Petroleum--Analysis) (MLRA 8:12)

DELONE, I. O.

USSR/Chemical Technology - Chemical Products and Their Application. Treatment of Natural Gases and Petroleum. Motor Fuels. Lubricants, I-13

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 62576

Author: Sergiyenko, S. R., Bedov, Yu. A., Teterina, M. P., Delone, I. O., Davylov, B. E.

Institution: None

Title: Use of the Adsorption Chromatography Method for the Separation and Investigation of Tarry Substances of Petroleum

Original Periodical: Tr. Komis. po analit. khimii AN SSSR, 1955, 6, 171-181

Abstract: A separation and investigation of the tarry substances of Georgian, Nebit dag, Tuymazin and Romashkin petroleum have been carried out. First by dilution with a 40-fold volume of pentane were separated the asphaltenes and the solution of tars and hydrocarbons was passed through the adsorbent. The best adsorbent was found to be ASK silica-gel of particle size 0.37-0.20 mm. Adsorbed tars were displaced

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Inst. Petroleum

USSR/Chemical Technology - Chemical Products and Their Application. Treatment of Natural Gases and Petroleum. Motor Fuels. Lubricants, I-13

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 62576

Abstract: successively with carbon tetrachloride, benzene, acetone and alcohol-benzene mixture (1:1). The tar fractions thus obtained were characterized according to elemental composition, molecular weight, iodine number, acidity and luminescence. For a more thorough separation of tar fractions they were separated by means of phenol. The investigations showed that tars of different petroleum differ appreciably from one another in quantitative ratios of the fractions as well as in properties and elemental composition of the latter. In the tars of all the investigated varieties of petroleum was observed a regular decrease in carbon content and increase in the content of hydrogen, oxygen and sulfur as well as of the C:H ratio on consecutive passing from first to last fraction. Regular changes were observed also in the other investigated properties of the fractions which indicate an appreciable difference between tar fractions. There are included color photographs of the luminescence of paper chromatographs of tar solutions and a detailed description is given of the luminescence picture.

Card 2/2

DELONE, I. O.

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1-H/V

The composition and properties of high-molecular-weight fractions of petroleum. III. An investigation of the composition and properties of the resin fraction of Tuimazin (Devonian) crude oil. S. R. Serebrin, I. O. Delone, Yu. A. Bolov, B. E. Davydov, and M. P. Tetenina. *Trudy Inst. Nefti, Akad. Nauk S.S.S.R.* 8, 35–41(1958); cf. *C.A.* 49, 14419*f*, 50, 11651*f*.—The resins were sepd. by adsorption on SiO_2 gel and subsequent extn. with solvents of increasing polarities to give the following fractions: CCl_4 54.7, C_6H_6 33.0, Me_2CO 17.9, and alc.-benzene 3.4%. The percentage of asphaltenes and asphaltogenic acids increased from the 1st to the 4th fraction. The percentage of H, S, and O increased, while C decreased in the same order. The constituents of the phenol-sol. fraction obtained from

70% of the gas used in the process is supplied by the mixt. and approx. 30% by the ring of jets. Cf. *C.A.* 50, 2930*e*.

Harry Tucker

SERGIYENKO, S.R.; DELONE, I.O.; DAVYDOV, B.E.; TETERINA, M.P.

Composition and properties of petroleum high molecular weight compounds. Article 4: Study of the composition and properties of the tarry portion of Romashkinskiy (Devonian) petroleum. Trudy Inst.neft. 8:42-46 '56. (MLRA 9:10)

(Romashkinskiy--Petroleum--Analysis)
(High molecular weight compounds)

SERGIYENKO, S.R.; DELONE, I.O.; DAVYDOV, B.E.; TETERINA, M.P.

Composition and properties of petroleum high molecular weight compounds. Article 5: Study of the composition and properties of the tarry portion of Bavly (Devonian) petroleum. Trudy Inst. neft. 8:47-51 '56. (MLRA 9:10)

(Bavly--Petroleum--Analysis)
(High molecular weight compounds)

SERGIYENKO, S.R., [illegible]NEVSKOVA, P.Ya.; DELONE, I.O.; KURBATSKAYA, A.P.

Distribution of trace elements in petroleum tars and asphaltenes.
Trudy Inst.nefti [illegible]:118-126 '59. (MIRA 13:12)
(Petroleum products) (Trace elements)

S/165/60/000/002/001/008
A104/A129

AUTHORS: Sergiyenko, S.R., Krasavchenko, M.I., Delone, I.O., and Rutman, L.I.

TITLE: The effect of the separation depth of distillate fractions on the composition and properties of hydrocarbons of heavy residues

PERIODICAL: Akademiya nauk Turkmenskoy SSR. Izvestiya. Seriya fiziko-tekhnicheskikh, khimicheskikh i geologicheskikh nauk, no.2, 1960, 13-20

TEXT: This article is a continuation of two articles published in the periodical Trudy Instituta nefti, 1958, vol. 12, no. 175 and 187 (Refs. 1 and 2) and describes investigations into changes of the composition of oil products at varying processing stages. Products were studied which were derived from heavy and light Il'skiy petroleum; their composition and properties were described in Refs. 1 and 2. The hydrocarbon portion of the products was separated by adsorption (Ref. 3, Sergiyenko, S.R., etc: Trudy Instituta nefti, 1954, IV, 103). The chemical nature of the separated

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The effect of the separation depth ...

hydrocarbons and the effect of the separation depth of distillate fractions, cracking degree and degree of oxidation on them was determined by chromatographic analysis. (Refs. 4 and 5, Sergiyenko, S.R., DAN SSR, 1953, no. 1 , and Trudy Instituta nefti, 1954, IV, 103). The analysis was carried out in an adsorption 40x17 cm column filled with 200 ml of activated porous silica gel; 150 ml of the hexane fraction containing no benzene passed through the column at 60-80°C followed by 10 g of test fraction diluted with the same solvent in the ratio of 1:3. Desorption of hydrocarbons is carried out with the help of the solvent in the following order: 200 ml hexane fraction, 100 ml benzene, 100 ml dehydrated alcohol-benzene mixture and 100 ml of the same mixture with non-dehydrated alcohol. The solvent is distilled on a water bath in nitrogen current; filled tubes were brought to constant weight and the refractive index of the residues was determined. Refractive index limits of different groups were based on information of Ref. 6, Clerc, R.J. and Kincannon, C.V., Analytical chemistry, and T.P.Wier, Jr., 1950, vol. 22,no. 7. With the raise of cracking depth and the parallel reduction of hydrocarbons in the cracking residues the amount of asphaltenes, carbones and carboids increased. The transformation process of the hydrocarbon portion in-

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The effect of the separation depth ...

to asphaltene substance is assumed to be as follows: monocyclic aromatic hydrocarbons - condensed aromatic hydrocarbons - tar-asphaltene substances. The heavy Il'skiy petroleum contains 18.5% of hydrocarbons of which 50% are paraffinic cycloparaffinic hydrocarbons. There are 8 tables and 6 references: 5 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Institut geologii i razrabotki goryuchikh iskopayemykh Akademii Nauk SSSR (Institute of Geology and Processing of Combustible Minerals of the Academy of Sciences of the USSR) and Odesskiy neftopererabatyvayushchiy zavod (Odessa Oil Refinery)

SUBMITTED: September 29, 1959

Card 3/3

S/204/62/002/002/004/007
I060/I242

AUTHORS: Delone, I.O., Osityanskaya, L.Z., and Petrov, Al.A.

TITLE: Redistribution of alkyl radicals in some benzene and naphthalene homologs

PERIODICAL: Neftekhimiya, v.2, no.2, 1962, 189-192

TEXT: This paper reports on the redistribution of radicals of pseudocumene, mesitylene, durene, 1,4-dimethyl-2-octylbenzene, and 2,6-dimethylnaphthalene. Experiments were conducted in the liquid phase in an autoclave at 250-300°C. In the presence of aluminosilicates the reaction $2A \rightleftharpoons B+C$ takes place at 300° with the formation of the nearest lower, and nearest higher homologs. For hydrocarbons of the type C_9H_{12}, the equilibrium compositions obtained were close to those computed. When radicals of different masses (1,4-dimethyloctyl-

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I060/I242

Redistribution of alkyl radicals...

benzene, are present in the benzenic nucleus, methyl radicals are the most active. In addition to redistribution of radicals, displacement reactions of radicals in the benzenic ring (isomeration) take place. In the case of naphthalenes the methyl radicals are displaced only inside one ring, i.e., there is no displacement of radicals from ring through positions 9,10. There are 2 tables.

ASSOCIATION: Institut geologii i razrabotki goryuchikh iskopayemykh AN SSSR (Institute of Geology and Processing of Igneous Minerals, AS USSR)

SUBMITTED: February 21, 1962

Card 2/2

L 62085-65 EPF(c)/EWT(m) Pr-4 RM

ACCESSION NR: AP5016836 UR/0204/65/005/003/0313/0319

547.626+547.514.71:542.952.1:547.659.1

19 17 B

AUTHORS: Delone, I. O.; Stukanova, L. N.; Petrov, Al. A.

TITLE: Isomerization of bicyclic naphthenes with isolated rings in the compounds of decalin series

SOURCE: Neftekhimiya, v. 5, no. 3, 1965, 313-319

TOPIC TAGS: hydrocarbon, isomeric transition, polycyclic compound, cyclic hydrocarbon, naphthenic ring, naphthalene/ KhV 1 chromatograph

ABSTRACT: Kinetics and the mechanism of decalin formation were studied on bicyclic five- and six-member naphthenes of different structures and molecular masses (dicyclopentyl, cyclohexycyclopentane, and dicyclohexyl). Isomerization with $AlBr_3$ was conducted in a rocking vessel at 30C. A 5% solution of $AlBr_3$ in n-nonane acted as a catalyst. The progress was studied by periodic sampling and by gas-fluid analysis in a KhV-1 chromatograph. The chromatogram of dicyclohexyl isomerization products, shown in Fig. 1 on the Enclosure, revealed that cis-decalin was the primary reaction product whose subsequent isomerization into trans-decalin was caused by its thermal instability at the experimental temperatures. The velocity

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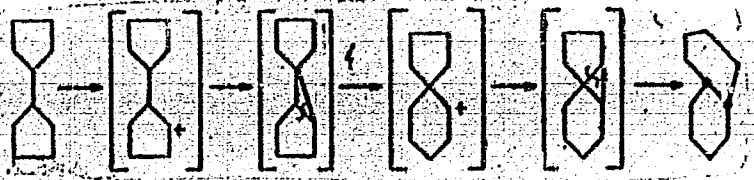
ACCESSION NR: AP5016836

constant was calculated using the equation $k = (2.3/t)\cdot\log(1/x)$, where x is the initial hydrocarbon concentration. The process developed according to the scheme:



Methyl decalins were the end products of this reaction (their chromatograms are included). Special experiments with their dehydration showed that a mixture of alpha- and beta-methyldecalins was formed early in the reaction, and that more stable trans-methyldecalin was also formed. The dicyclohexyl isomerization produced 70% of ethylnaphthalene with the prevalence of beta-ethylnaphthalene. Orig. art. has: 3 tables and 5 figures.

ASSOCIATION: Institut geologii i razrabotki goryuchikh iskopayemykh (Institute of Geology and Exploitation of Mineral Fuels)

SUBMITTED: 25Apr64 ENCL: 01 SUB CODE: OC,GC

NO REF SOV: 008 OTHER: 001

Card 2/3

L 62085-65
ACCESSION NR: AP5016836

ENCLOSURE: 01

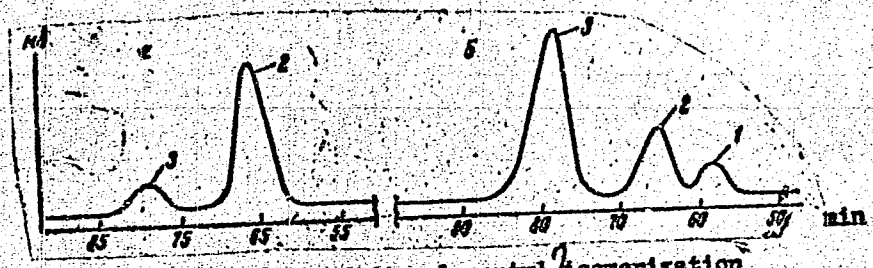


Fig. 1. Chromatogram of dicyclopentyl isomerization products. a- 10 min. reaction; 6 - 60 min. reaction; 1- trans-decalin; 2- dicyclopentyl; 3- cis-decalin

Card 3/3

DELONE, L. N.

1. ZDRIK'KO, A. F.; DELONE, L. N.

2. USSR (600)

4. Wheat

7. Testing winter wheat varieties under irrigation conditions, Sel. 1 sem., 20, No. 1, 1953.

9. Monthly List of Russian Accessions, Library of Congress, April, 1953, Uncl.

DEL'ONE, N. L. N.

Dissertation: "Crop Formation in Various Kinds of Winter Wheat in Relation to Their Biological Features and Conditions of Cultivation." Cand Biol Sci, Moscow Order of Lenin State U imeni M. V. Lomonosov, 4 Jun 54. Vechernyaya Moskva, Moscow, 26 May 54.

SO: SUM 284, 26 Nov 1954

DELONE, L. N.

USSR/Agriculture Wheat

Card : 1/1

Authors : Delone, L. N.

Title : The Kharkov-4 wheat type

Periodical : Nauka i Zhizn'. 5, 35, May 1954

Abstract : An illustrated comparison is given between the Kharkov-4 and the Odessa-3 wheat.

Institution : ....

Submitted : ....

COUNTRY : USSR
CATEGORY : Cultivated Plants. Cereals. M

ABS. JOUR. : RZhBiol., No.14, 1958, No. 63316

AUTHOR : Delone, L. N.
INST. : Kharkov University
TITLE : On the Choice of Correct Trends in Selecting Winter Wheat for Yield.

ORIG. PUB. : V sb.: Vopr. metodiki selektsii pshenitsy i kukuruzy. Khar'kov, Un-t, 1957, 73-80

ABSTRACT : The author points out the significance of the analysis of the elements of the structure of a crop in the work on the selection of winter wheat, and sums up the data on the work on the collection of regional and prospective varieties of Ukrainian selection and varieties adapted for regions in non-chernozem zone. A number of high-yield varieties (Odesskaya 3, Ul'yanovka) are distinguished by a low productivity of the spikes with a high productivity of bushiness. It is suggested to call them conditionally "small-spiked". To varieties with opposite characteristics,

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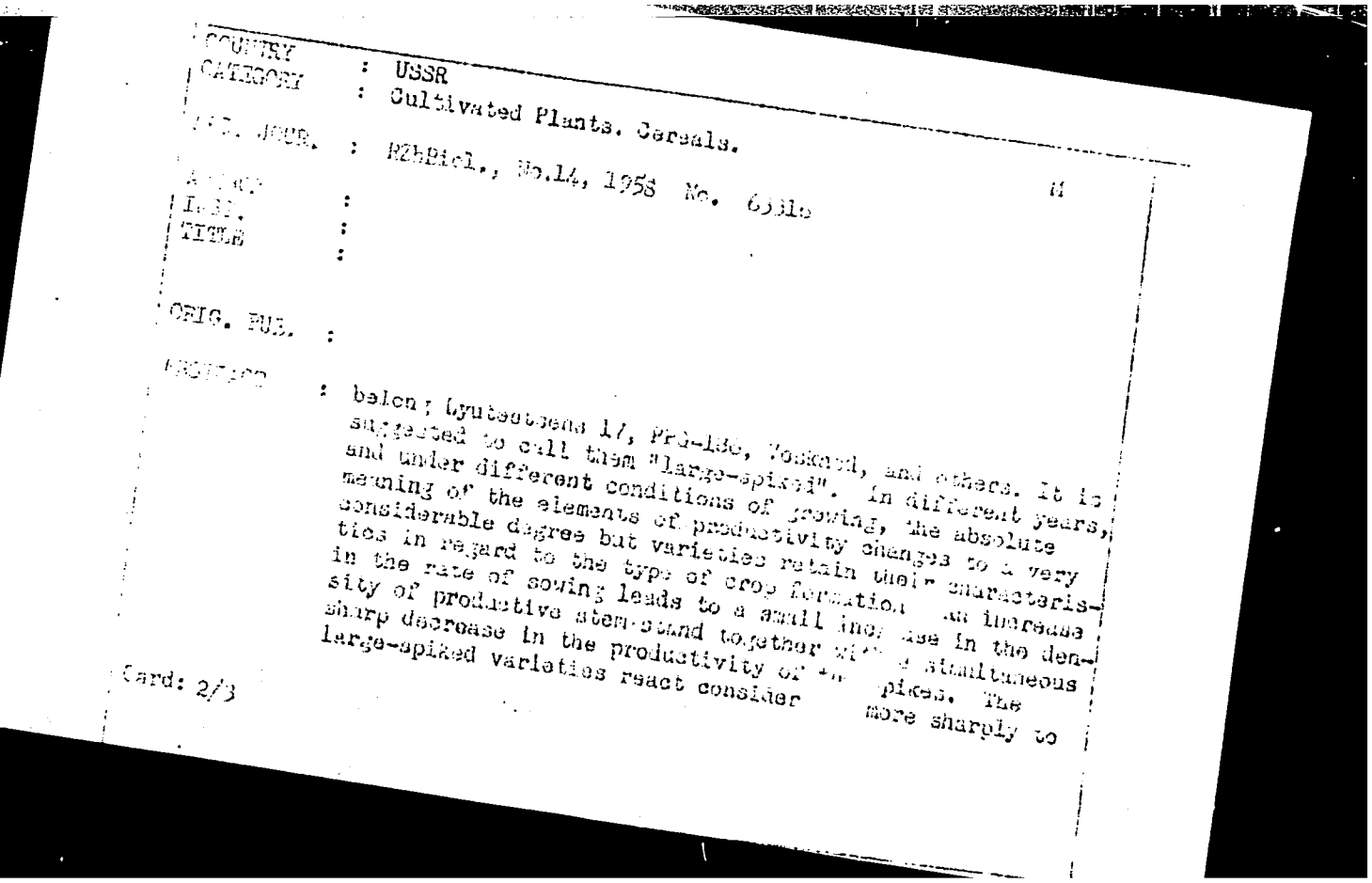

COUNTRY : USSR
CATEGORY : Cultivated Plants. Cereals.
ABS. JOUR. : RZhBiol., No.14, 1958 No. 63316
AUTHOR :
INST. :
TITLE :

ORIG. PUB. :

ABSTRACT : belon; Lyutestsens 1/, Pro-Lac, Yoskard, and others. It is suggested to call them "large-spiked". In different years, and under different conditions of growing, the absolute meaning of the elements of productivity changes to a very considerable degree but varieties retain their characteristics in regard to the type of crop formation. An increase in the rate of sowing leads to a small increase in the density of productive stems standing together with a simultaneous sharp decrease in the productivity of the spikes. The large-spiked varieties react considerably more sharply to

Card: 2/3

COUNTRY : U.S.S.R

CATEGORY : Cultivated Plants. Cereals.

ABS. JOUR. : RZhBiol., No. 14, 1958 No. 63815

AUTHOR :

INST. :

TITLE :

ORIG. PUB. :

ABSTRACT : The changes in the conditions of growing, agricultural technique, and weather conditions since under unfavorable conditions the number of grains in their spikes decreases considerably but they become a great deal more resistant to lodging. The conclusion is made regarding the necessity of raising both the small-spiked varieties - for poor agricultural backgrounds, and large-spiked ones - for more favorable conditions. Varieties must be adapted to the regions not only geographically but also in accordance with the agricultural conditions. -- I.N. Zaikina

Card: 3/3

USSR / General Biology. Genetics.

Abs Jour : Ref Zhur - Biol., No 12, 1958, No 52430

B-5

system. In Sweden, field resistant barley was obtained in this way, and in the U.S. oats which were resistant to fungal disease. The possibilities of obtaining mutations of one character or another by use of various types of radiation is indicated. -- A. I. Kuptsov.

Card 2/2

VLASYUK, P.A., akademik, otv.red.; YUR'YEV, V.Ya., akademik, zam.otv.red.; BUZANOV, I.F., akademik, red.; DANILENKO, I.A., red.; DELONE, L.M., doktor biolog.nauk, red.; KUCHUMOV, P.V., doktor sel'skokhoz. nauk, red.; POLYAKOV, I.M., red.; STRONA, I.G., kand.sel'skokhoz. nauk, red.; TKACHENKO, F.A., kand.sel'skokhoz.nauk, red.; CHIZHENKO, I.A., kand.ekonom.nauk, red.; BLANINA, L.F., red.; VIDONYAK, A.P., khud.-tekhn.red.

[Problems in improving the quality of agricultural products; proceedings of the scientific session] Voprosy uluchsheniia kachestva sel'skokhoziaistvennoi produktsii; trudy nauchnoi sessii. Kiev, Izd-vo Ukrainskoi Akad.sel'khoz.nauk. No.4. [Feeds and livestock products] Korma i produkty zhivotnovodstva. 1960. 143 p. (MIRA 14:1)

1. Ukrainskiy ordena Lenina nauchno-issledovatel'skiy institut rasteniyevodstva, selektsii i genetiki. 2. Chlen-korrespondent Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk imeni V.I.Lenina i Ukrainskoy akademii sel'skokhozyaystvennykh nauk; Nauchno-issledovatel'skiy institut zhivotnovodstva Lesostepi i Poles'ya USSR (for Danilenko). 3. Chlen-korrespondent AN USSR (for Polyakov). 4. Ukrainskiy ordena Lenina nauchno-issledovatel'skiy institut rasteniyevodstva, selektsii i genetiki (for Strona).

(Feeds) (Stock and stockbreeding)

DELONE, N.

AUTHOR: Delone N., Candidate of Biological Sciences 4-6-11/30

TITLE: Radio-Selection (Radioselektsiya)

PERIODICAL: Znaniye - Sila, 1957, # 6, pp 16-19 (USSR)

ABSTRACT: Scientists are able to produce a great number of artificial mutations by exposing living organisms to the effect of certain chemical combinations, ultra-violet rays, or ionizing radiation. In such a way it is possible to alter any quality, without affecting other valuable attributes. This new method will complement, not replace hybridization.

The utilization of radioactivity opens new possibilities to transform nature in a direction useful for human purposes. For this purpose various forms of ionizing radiation are employed, such as gamma-rays, X-rays, fast electrons, protons, neutrons and beta- particles.

The author draws attention to the fact that only a small percentage of all the produced hereditary variations are of value; each thousand new variations contains only one or two positive forms. The value of radiation consists in the fact that among the great number of negative forms it is possible

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62-6-12/24

AUTHOR N.B.DELONE

TITLE The Determination of the Axis of the γ-ray Bundle by Means of a Sector-Ionization Chamber.
(Nakhozhdeniye osi puchka γ-luchey sektornoy ionizationnoy kameroy -Russian)

PERIODICAL Atomnaya Energiya, 1957, Vol 2, Nr 6, pp 569-57o (U.S.S.R.)

ABSTRACT When working with betatrons and synchrotrons it is often necessary to be able to determine the axis of the γ-bundle quickly and reliably. I.N.USOVA (laboratories for accelerators and photonuclear reactions of the Physical Institute of the Academy of Science of the U.S.S.R.) developed a very effective method for the determination of the axis of this bundle by using the sector-ionization chamber. The principle of the effect produced by this chamber is illustrated by means of a drawing. Four sectors cur into a block form the operational volumina of 4 ionization chambers. The ionization currents of the 4 sector-shaped operational volumina will then be equal to one another if the axis of the γ-bundle coincides with the center of the sector chamber. The dimensions of the chamber must be of the same order as the half-value distribution of intensity in the bundle. The bundle axis is determined by shifting the chamber in the plane which is vertical to the axis. If the chamber is in the correct position, the ionization currents of all operational volumina must be equal. An attached photograph shows a total view of

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Delone N.B.

AUTHORS: Belousov, A.S., and Delone, N.B. (Moscow) 47-5-2/16

TITLE: Forty Years of Soviet Physics (Sorok let sovetskoy fiziki)

PERIODICAL: Fizika v Shkole, September - October 1957, No 5, pp 9-18 (USSR)

ABSTRACT: The article points to the achievements in industry, agriculture, science and culture since the October Revolution. The article mentions the world's first atomic power plant built in the USSR under the direction of D.I. Blokhintsev, and gives a historical review of the most important discoveries of Soviet physicists. It calls attention to powerful atomic power plants which are being constructed, to an atomic icebreaker and atomic locomotives under design, and also to a powerful atomic weapon. At present, the Soviet physicists work on humanity's most important problem - the realization of the controlled thermonuclear reaction. The article further points to the world's largest phasotron and synchrophasotron, at the USSR United Institute of Nuclear Research (Ob'yedinënnyy institut yadernykh issledovaniy). The phasotron accelerates protons to an energy of 680 Mev. The synchrophasotron drives the protons to an energy of 10 Bev while the synchrotron at the Physical Institute of the USSR Academy of Science (Fizicheskiy institut AN SSSR) accelerates electrons to an energy of 265 Mev. The

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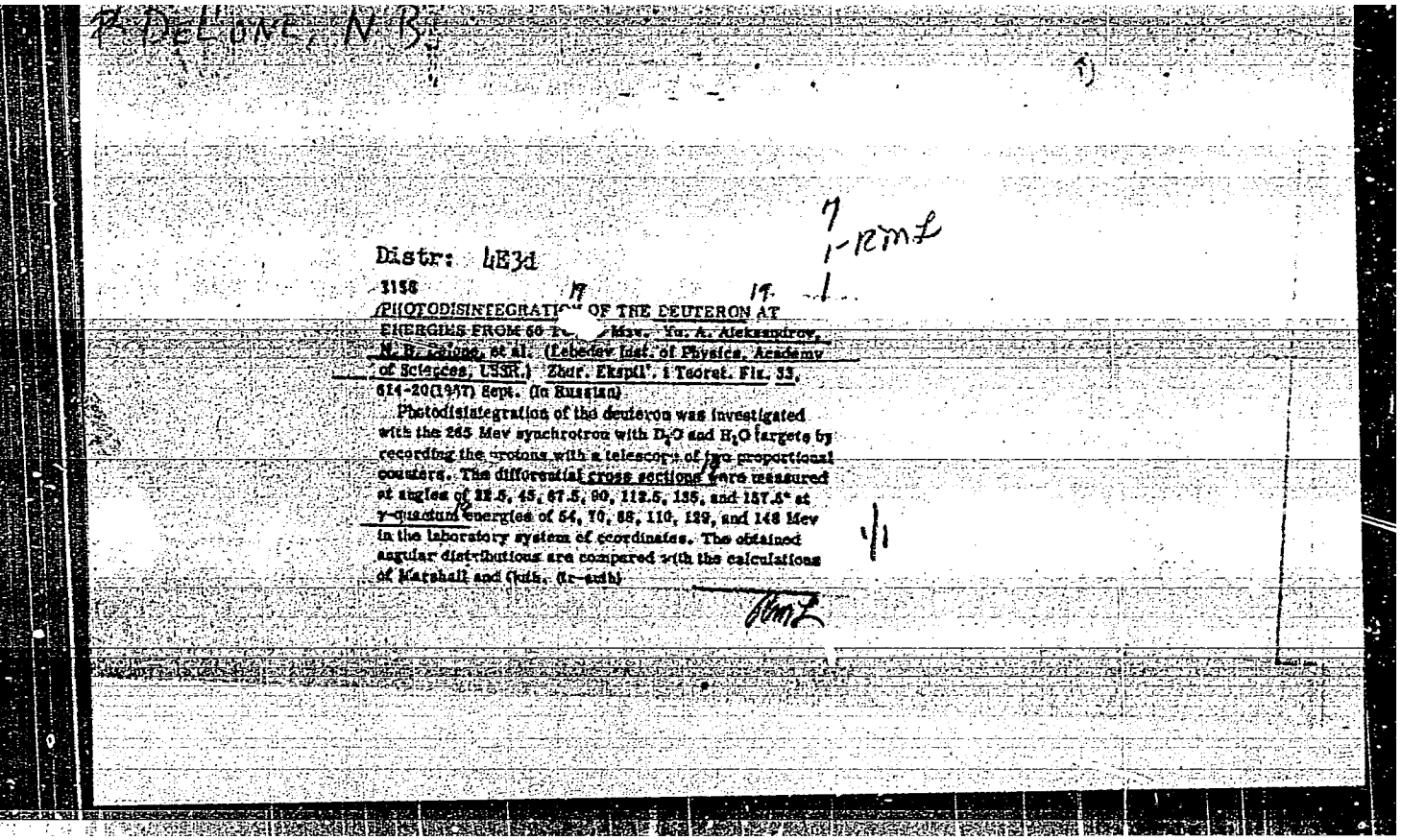
articles mentions the so-called Cherenkov radiation discovered by P.A. Cherenkov. It was proved that this radiation is caused by second electrons arising in the substance under the influence of γ-rays. It further hints to the important role played by D.S. Rozhdestvenskiyin the development of Soviet optics. He became known for his classical researches on anomalous dispersion. The next section deals with physics of low temperatures, and the researches of P.L. Kapitsa and L.D. Landau with helium II which led to the discovery of superfluid helium, one of the two components of helium II. The discovery of the phenomenon of superfluidity creates a new possibility for approximating absolute zero in temperature. Another section deals with the theoretical and experimental researches by A.F. Ioffe on the rectifying property of semi-conductors which served as a basis for making crystal diodes and triodes, and replaced electron tubes in several technological branches. The discovery of ferroelectricity by I.V. Kurchatov and P.P. Kobeko is regarded as one of the basic achievements in the physics of dielectrics. It proved that within some substances (f.i. Seignette's salt) there are fields with an aligned electric moment. In many respects the phenomenon of ferroelectricity is analogous to ferromagnetism. Ferroelectricity



P. DELAHAYE, N. BY.

Distr: 4E3d

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PHOTODISINTEGRATION OF THE DEUTERON AT ENERGIES FROM 60 TO [illegible] Mev. Yu. A. Aleksandrov, N. B. Delone, et al. (Lebedev Inst. of Physics, Academy of Sciences, USSR.) Zhur. Eksptl'. i Teoret. Fiz. 33, 614-20(1957) Sept. (In Russian)

Photodisintegration of the deuteron was investigated with the 265 Mev synchrotron with D_2O and H_2O targets by recording the protons with a telescope of two proportional counters. The differential cross sections were measured at angles of 22.5, 45, 67.5, 90, 112.5, 135, and 157.5° at γ-quantum energies of 64, 70, 88, 110, 129, and 148 Mev in the laboratory system of coordinates. The obtained angular distributions are compared with the calculations of Marshall and Guth. (tr-auth)

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21.5200

AUTHORS: Aleksandrov, Yu.A., Gorbunkov, V.M., Delone, N.B. and Likhachev, V.M.

TITLE: On the Formation of Image in Bubble-chamber Track Photography

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, Nr 1, pp 113 - 114 (USSR)

ABSTRACT: The bubbles which form the particle tracks in a bubble chamber are light scattering irregularities. They may be looked upon as spherical lenses having a refractive index which is different from that of the surrounding medium. The optical properties of such irregularities are determined by their relative refractive index and radius of curvature (Ref 1). In a bubble chamber, the refractive index of the liquid is greater than that of the bubble and, therefore, the latter behaves as a negative lens. The incident light is therefore refracted in the bubble and produces a virtual image of the source of light near the image of this "lens". Rays refracted by the lens and entering the objective of the photographic camera produce an image, not of the

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On the Formation of Image in Bubble-chamber Track Photography

bubble, but the virtual source which lies near the focus of the bubble. It is therefore of interest to consider the effect of the difference in the position of the bubbles and the corresponding images of the source of light. For paraxial rays incident from infinity the distance from the centre of the spherical lens of radius R to the image is given by:

$$f' = \frac{1}{2} Rn_2/\Delta n$$

where Δn is the difference between the refractive indices of the liquid and the bubble. Each point of the source of light is imaged near the focus of the spherical lens, and the entire source is imaged with a magnification given by $\beta \cong f'/L$ where L is the distance from the source of light to the bubble. Clearly, in the case of bubble chambers and particularly in the case of liquid-hydrogen bubble chambers in which Δn is small, the spatial separation of the bubbles and the images of the light sources will be very small. It has

On the Formation of Image in Bubble-chamber Track Photography

been found with the aid of a model that aberration and diffraction effects are negligible. A large-scale photograph was taken of bubbles in a propane chamber using the apparatus shown in Figure 1. The illuminating system consists of a source of light S , an opaque screen A and a diffuse reflector B . Figure 2 shows photographs of electron tracks in the propane bubble chamber. The electrons were due to Co^{60} sources. In Figure 2, photograph (a) was obtained with a single source (a small hole in a screen); (б) with two holes; (B) with three holes; (г) and (д) with a ring source. From a knowledge of the geometry of the experiment it was possible to estimate the diameters of the bubbles. They were found to be between 0.1 and 0.4 mm, depending on illumination conditions. It is concluded that the recorded bubbles are in fact images of the source of light. The spatial displacement of the image of the source relative to the centre of the bubble is not small. Thus, in the case of liquid hydrogen the quantity f' is

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On the Formation of Image in Bubble-chamber Track Photography

approximately equal to 6R . Acknowledgment is made to G.G. Slyusarev for valuable discussions.
There are 2 figures and 1 Soviet reference.

ASSOCIATION: Fizicheskiy institut AN SSSR (Physical Institute of the Ac.Sc., USSR)

SUBMITTED: November 20, 1958

4

Card 4/4

86756

S/120/60/000/006/032/045
E032/E314

21.5200 (1033, 1144, 1191)

AUTHORS: Aleksandrov, Yu.A., Delone, N.B., Likhachev, V.M. and Gorbunkov, V.M.

TITLE: Formation of the Image in the Photography of Bubble-chamber Tracks

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No. 6, pp. 118 - 119

TEXT: It was shown in Ref. 1 that when bubble-chamber tracks are photographed, the object which is actually photographed is the virtual image of the source in the bubbles. The refractive index of the vapour in the bubble is smaller than the refractive index of the surrounding liquid and hence the bubble is divided into two zones. The bubble constitutes a negative lens for rays incident at angles smaller than the angle of the total internal reflection, and a convex spherical mirror for rays incident at angles greater than the angle of total internal reflection. This is illustrated in Fig. 1. The point source S_o is located at infinity on the left of

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Formation of the Image in the Photography of Bubble-chamber Tracks

the bubble. The ray 1 is refracted, while the ray 2 is reflected. Intermediate rays having angles of incidence $i_1(i_2)$ have the corresponding values of $h_1(h_2)$ and $\varphi_1(\varphi_2)$. They form virtual images $S'_{01}(S'_{02})$ of the source S_o on the axis S_oO. Both for the refracted and reflected rays we have

$$h_{1|(2)} = r \sin i_{1(2)}, \quad h_{1(2)} = H_{1|(2)}$$

while for the refracted rays we have

$$\varphi_1 = 2(i'_1 - i_1) \quad \text{and} \quad n_{\text{ж}} \sin i_1 = n_{\text{п}} \sin i'_1$$

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Formation of the Image in the Photography of Bubble-chamber Tracks

where $n_ж$ is the refractive index of the liquid and

$n_п$ is the refractive index of the vapour.

For the reflected rays $\varphi_2 = 2(90^\circ - i_2)$. The objective of the photographic camera receives a narrow pencil of rays whose aperture is defined by the diameter of the entrance pupil of the objective and the distance to the working volume of the camera. For an objective with a focal length of 50 mm, a relative power of 1:20 and a distance to the working volume of 500 mm, the aperture of the pencil is about 0.5°. It follows that the image formed by the objective is due only to a very narrow pencil of rays. Such a pencil will experience only paraxial aberrations, i.e. astigmatism and distortion. In order to confirm the above theory of image formation, an expriment was carried out using two sources of light located symmetrically with respect to the objective-bubble axis. In this geometry each bubble forms four virtual images, two of

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Formation of the Image in the Photography of Bubble-chamber Tracks

which are produced by the refracting zone and two by the reflecting zone. The distance between each corresponding pair of images, which is equal to $2H_1$ and $2H_2$ in the two cases, respectively, depends on the radius of the bubble. For all bubbles, $2H_2$ is determined by the relative refractive index of the liquid and the vapour $n_{ж}/n_{п}$.

In the experiment, an objective having a focal length of 240 mm and a relative power of 1:16 was employed. It was found that the above theory describes the experimentally obtained results to a high degree of accuracy.

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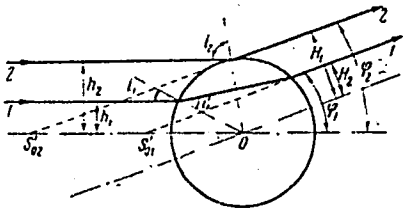

There are 2 figures and 1 Soviet reference.

ASSOCIATIONS: Fizicheskiy institut AN SSSR (Physics Institute of the AS USSR) Moskovskiy fiziko-tekhnicheskiy institut (Moscow Physico-technical Institute)

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86756

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E032/E314

Formation of the Image in the Photography of Bubble-chamber Tracks

SUBMITTED: September 29, 1959

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86757

S/120/60/000/006/033/045
E032/E314

21.5200 (1033, 1144, 1191)

AUTHORS: Aleksandrov, Yu.A., Delone, N.B., Likhachev, V.M. and Gorbunkov, V.M.

TITLE: On the Rate of Growth and the Rate of Upward Drift of Bubbles in a Propane Chamber

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No. 6, p. 120

TEXT: It was shown in previous papers by the present authors (Refs. 1, 2) that when particle tracks in bubble chambers are photographed, the object which is photographed is the virtual image of the source in the bubbles. The experiment described in Ref. 2, in which two sources of illumination were employed will also provide information about the rate of growth and the rate of upward drift of bubbles. The experiments reported in the present note were similar to those described in Ref. 2 (see the previous abstract of this issue), except for the sources of illumination. Two pulsed lamps were used to illuminate the two sources using a delay of 7, 14, 22 and 30 μs, respectively. A photograph of two

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On the Rate of Growth and the Rate of Upward Drift of Bubbles in a Propane Chamber

successive flashes of the lamps was obtained on each plate. During the time between the flashes each bubble increases in size and drifts upwards. The growth of the bubble leads to an increase in the distance between the dots in the horizontal direction, while the upward drift leads to a displacement of the dots in the vertical direction. A typical photograph is shown in Fig. 1. The radius of the bubbles was measured by the method described in Ref. 2. In the four series of measurements which were carried out the initial radius was between 0.1 and 0.2 mm and the final radius between 0.2 and 0.36 mm. According to Seitz (Ref. 3), the radius in mm is related to the time in sec by the formula $r = Ct^{1/2}$. The value obtained for the constant is : $C_{exp} = (5.8^{+2.6}_{-1.2})10^{-2}$.

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E032/E314

On the Rate of Growth and the Rate of Upward Drift of Bubbles in a Propane Chamber

The errors indicated represent maximum deviations. According to Plesset and Zwick (Ref. 4), the constant C for propane has the theoretical value of 0.17. The rate of upward drift for the above range of bubble radii was found to be 0.036 and 0.117 mm/sec. It is clear that the rate of upward drift is appreciably greater than the rate of growth of the bubbles, i.e. during its growth each bubble is displaced through the surrounding medium. This fact was not taken into account by Seitz (Ref. 3). The heat exchange between the bubble of liquid, which determines its rate of growth, will be greater in the case of a moving bubble. This will lead, in the case of the present experiment, to a discrepancy between experiment and theory, as indicated above. Further work is being carried out in this connection.

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E032/E314

On the Rate of Growth and the Rate of Upward Drift of Bubbles in a Propane Chamber

There are 1 figure and 4 references: 2 Soviet and 2 English.

ASSOCIATIONS: Fizicheskiy institut AN SSSR
(Physics Institute of the AS USSR)
Moskovskiy fiziko-tekhnicheskiy institut
(Moscow Physico-technical Institute)

SUBMITTED: September 29, 1959

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39148
S/120/62/000/003/007/048
E032/E114

21600

AUTHORS: Aleksandrov, Yu.A., Voronov, G.S., and Delone, N.B.

TITLE: The rise of bubbles and distortion of tracks in bubble chambers

PERIODICAL: Pribory i tekhnika eksperimenta, no.3, 1962, 50-51

TEXT: In a previous paper (Yu.A. Aleksandrov, N.B. Delone, V.M. Likhachev, V.M. Gorbunkov, PTE, no.6, 1960, 120) it was shown that as the bubbles forming the track expand, they float up through a distance which is considerably greater than their radius, and this gives rise to a displacement of the tracks. In the present note the authors make use of their theory of the growth of bubbles (FIAN, A-131, 1961) to calculate this displacement and estimate the distortion of tracks. Explicit formulae are given which may be used to compute these effects. In a typical hydrogen chamber (N.C. Barford, Progr. in Cryog., 2, 1960, 88) a spurious radius of curvature due to unequal displacement of tracks along their lengths was found to be of the order of 20 m. The distortion may be reduced either by ensuring that the bubbles

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have sufficiently small radii, or by increasing the rate of growth of the bubbles. In practice it is always possible to reduce the distortion by a suitable choice of the working parameters.

ASSOCIATION: Fizicheskiy institut AN SSSR
(Physics Institute, AS USSR)

SUBMITTED: June 5, 1961

Card 2/2

ALEKSANDROV, Yu.A.; VORONOV, G.S.; DELONE, N.B.

The sensitivity of fluids to radiation. Zhur. eksp. i teor. fiz. 43 no.4:1552-1554 O '62. (MIRA 15:11)

1. Fizicheskiy institut im. P.N. Lebedeva AN SSSR.
(Bubble chamber) (Cobalt—Isotopes)

L 24507-65 EWT(m) IJP(c)/SSD/BSD/AFMD(c)/AEDC(a)/SSD(a)/AFWL/ASD(p)-3
AM4020390 BOOK EXPLOITATION ASD(a)-5

Aleksandrov, Yu. A.; Voronov, G. S.; Gertunkov, V. M.; Delone, N. B.; Nechayev, Yu. I.

Bubble chambers (Puzyr'kovyye kamery*) Moscow, Gosatomizdat, 1963. 339 p. illus., biblio. Errata slip inserted. 3600 copies printed. Under the editorship of: Delone, N. B.; Editor: Matveyeva, A. V.; Technical editor: Popova, S. M.; Proofreader: Smirnov, M. A.

TOPIC TAGS: Bubble chamber, charged particle, track formation, track observation, photofilm scattering, hydrogen refraction, superheated liquid, vapor bubbles, hydrogen chamber

PURPOSE AND COVERAGE: The book represents the first attempt at a systematic exposition of the principles of the operation and the design of bubble chambers and of their possibilities for the observation of particles. Special attention is paid to the physics of the formation and the observation of tracks in the bubble chamber, to generalization of separate data concerning the properties of the working medium, and to chamber design and future trends. V. I. Veksler directed the

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authors' attention to the need for this compilation. The authors utilized the work of specialists at the Ob"yedinennyy Institut Yadernykh Issledovaniy, the Institut Teoreticheskoy i Eksperimental'noy Fiziki, the Fizicheskiy Institut Akademii Nauk SSSR, and the Moskovskiy Inzhenerno-Fizicheskiy Institut. The authors were aided directly by L. Pernshteyn (computing the scattering of photo-films), V. Morozov (checking the computations of the geometric theory of indica-trices), E. Sviridenkov and A. Suchkov (obtaining data concerning the refractive index of hydrogen), Ye. Zubova (programming and performing the computer work), and G. Panomareva (preparing the illustrations).

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L 11396-63 EWT(m)/BDS AFFTC/ASD

S/120/63/000/002/008/041

53

AUTHOR: Aleksandrov, Yu. A., Voronov, G. S., amd Delone, N. B.

TITLE: Growth and condensation of bubbles in bubble chambers 19

PERIODICAL: Pribory i tekhnika eksperimenta, March-April 1963, v. 8, no. 2, 41-44

TEXT: The article discusses growth and condensation of vapor bubbles in a superheated liquid in order to account for flotation effects. It is shown that flotation effects substantially influence the rates of growth and condensation. Formulas are derived for the growth rate, the time dependence of the radius, the time necessary for condensation, and the heat dissipation. These formulas are used to analyze the processes necessary for resetting the chamber to initial conditions and the efficiency of chamber operation in registering rare random events. There are two figures.

ASSOCIATION: Fizicheskiy institut AN SSSR (Physics Institute, Academy of Sciences USSR)

SUBMITTED: June 18, 1962

Card 1/1 ja/CL

ALEKSANDROV, Yu.A.; VORONOV, G.S.; DELONE, N.B.

Measuring the rate of growth of bubbles in a propane chamber. Prib. i tekh. eksp. 8 no.3:62-63 My-Je '63. (MIRA 16:9)

1. Fizicheskiy institut AN SSSR.

(Bubble chamber)

ALEKSANDROV, Yu.A.; DELONE, N.B.

Measuring the radiosensitivity zone boundary for propane. Prib. i tekh. eksp. 8 no.3:64-65 My-Je '63. (MIRA 16:9)

1. Fizicheskiy institut AN SSSR.
(Bubble chamber) (Propane)

DELONE, N.B. (Moskva)

Scintillating bubble chamber. Priroda 52 no.3:112-114 '63.
(MIRA 16:4)
(Bubble chambers)

DELONE, N.B. (Moskva)

A controlled liquid track chamber. Priroda 52 no.4:109-110 '63. (MIRA 16:4)

(Photography, Particle track)

ACCESSION NR: AP4019255 S/0056/64/046/002/0814/0816

AUTHORS: Askar'yan, G. A.; Delone, N. B.; Rabinovich, M. S.

TITLE: Action of intense light on matter and particle beams in a magnetic trap

SOURCE: Zhurnal eksper. i teor. fiz. v. 46, no. 2, 1964, 814-816

TOPIC TAGS: plasma, magnetic trap, magnetic trap filling, ionization, ionization by light flash, trap filling by light, plasma confinement, ion dissociation, molecule dissociation, neutral atom ionization

ABSTRACT: The paper evaluates the efficiency of filling magnetic traps with fast ions produced by (1) heating and ionization of solid matter by a powerful flash of focused light in a magnetic field and (2) the action of intense light on beams of fast particles entering the trap. A method proposed by N. G. Basov and O. N. Krokhin is shown

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ACCESSION NR: AP4019255

(ZhETF, v. 46, 171, 1964) to heat the ions through electron collisions in a focused beam of coherent light has low efficiency and that it is better to have the ions produced by the light directly, and not through the intermediacy of the electrons. The resultant ion energy is estimated to be approximately 10 times thermal, and in view of the small initial dimensions of the heated region the plasma can be confined by means of a pulsed magnetic field. The second method is based on a recently established fact that a focused beam of coherent light exerts strong ionizing action on a rarefied gas (E. Damon and R. Tomlinson, Applied Optics, v. 2, 546, 1963; F. V. Bunkin and A. M. Prokhorov, ZhETF, v. 46, 1090, 1964). The fact that the ionization probability increases exponentially with the power of the light ($W \sim e^{BP}$, where $B \approx 3 \times 10^{-2}$ kW^{-1}) favors effective ionization of even fast particles. It is shown that the strong electric field of the coherent light can be used also to dissociate or ionize molecular ions in addition to ionizing neutral atoms following their entry into the trap. Further research is

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ACCESSION NR: AP4019255

therefore urged, aimed at theoretical and experimental studies of ionization and dissociation of mol cules and molecular ions in a strong light field. Orig. art. has: 1 formula.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute, AN SSSR)

SUBMITTED: 20Nov63 DATE ACQ: 27Mar64 ENCL: 00

SUB CODE: PH NO REF SOV: 004 OTHER: 001

Card 3/3

L 53579-65 EWA(k)/FBD/EWG(r)/EWT(l)/EWP(e)/EWP(m)/EPF(c)/EEC(k)-2/EWP(i)/EPF(n)-2/
EPR/EEC(t)/T/EWP(t)/EEC(b)-2/EWP(k)/EWP(b)/EWA(m)-2/EWA(h) Pm-4/Pn-4/Po-4/Pf-4/
ACCESSION NR: AP5014201 Pr-4/Ps-4/Peb/Pi-4/Pu-4/ UR/0386/65/001/002/0042/0045
Pl-4 SCTB/IJP(c) WG/JD/WH

AUTHOR: Voronov, G. S.; Delone, N. B.

TITLE: Ionization of a xenon atom by the electric field of a ruby laser beam

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 1, no. 2, 1965, 42-45

TOPIC TAGS: ruby laser, xenon, ionization, Q spoiled laser, electric field, multiphoton absorption, nonlinear effect

ABSTRACT: An electric field, generated by focusing a beam from a Q-spoiled ruby laser at λ = 6943 Å, was used experimentally to ionize a xenon atom. Since the ionization potential of xenon is 12.13 ev, ionization of the xenon atom required the absorption of seven photons, each with an energy of 1.78 ev. The intensity and spatial distribution of the electric field were measured photometrically, as shown in Fig. 1 of the Enclosure. Emission from laser 1 was directed at lens 3 by means of mirror 2. Ions, generated at focus 4, were pulled by a uniform electric field 5 with an intensity of ~10 v/cm toward collector 6. That portion of the laser beam which passed through mirror 2 and was attenuated by neutral filters 7, was beamed at lens 8 (identical to 3 and located at the same distance from the laser).

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ACCESSION NR: AP5014201

The spatial distribution of illumination at various cross sections of the focusing region was projected (on a magnified scale) by microlens 9 onto photographic film 10. The experiments were conducted at a pressure <10-2 mm Hg, when the length of the free path was ≤1 cm, i.e., when this value was two orders of magnitude larger than the dimensions of the region in which the above field intensity was achieved. Thus, the effect observed was a result of the field being exerted on individual atoms. Noise due to ions generated at the surface of lens 8 was fully eliminated by using a direct electric field to collect ions on 6. The sensitivity threshold was 4×10^3 ions, and $\sim 10^5$ xenon ions were generated during a 20-nanosecond laser pulse. This corresponds to an effectiveness of ~1% and an ionization probability of $\sim 5 \times 10^5$ sec^{-1}. The results differ sharply from those obtained by E. Damon and R. Tomlison (Appl. Opt., 2, 546, 1963) who, according to the authors, apparently failed to overcome ion noise. The experimentally observed value of the threshold electric field (8.0×10^6—1.5×10^7 v/cm) compared favorably with theoretical computations by other authors (L. V. Keldysh, ZHETF, 47, 1945, 1964; A. Gold and B. Babb, Phys. Rev. Lett., 14, 60, 1965). Orig. art. has: 1 figure. [YK]

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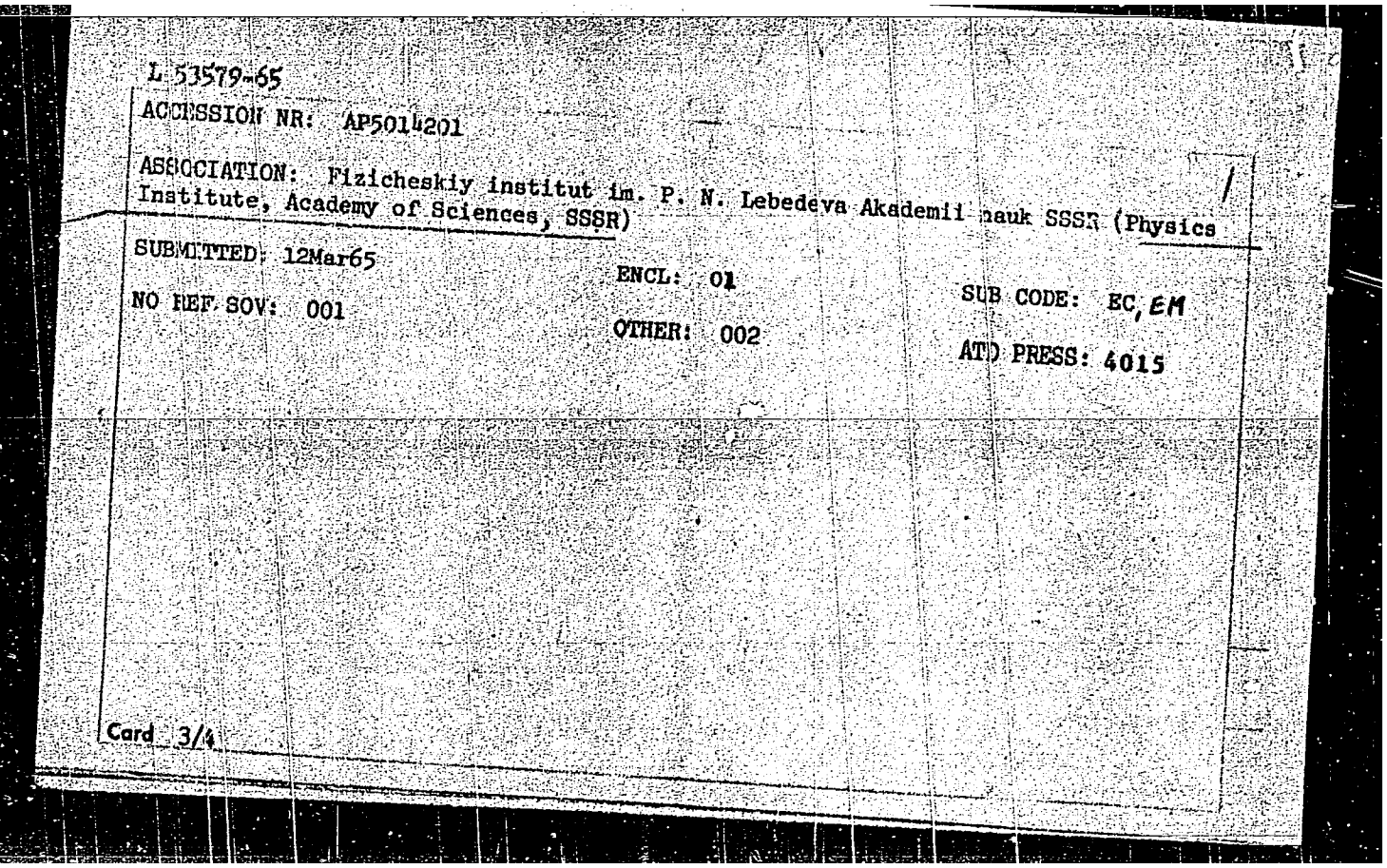

L 53579-65

ACCESSION NR: AP5014201

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSSR)

SUBMITTED: 12Mar65 ENCL: 01 SUB CODE: EC, EM

NO REF SOV: 001 OTHER: 002 ATD PRESS: 4015

Card 3/4

L 64113-65 EWP(e)/EWT(m)/EWP(i) WR

ACCESSION NR: AP5021096 UR/0056/65/049/002/0386/0388

AUTHOR: Barkhudarova, T. M.; Voronov, G. S.; Gorbunkov, V. M.; Delone, N. B.

TITLE: Spatial distribution of the electrical field set up by a focused ruby laser beam

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 2, 1965, 386-388

TOPIC TAGS: ruby laser, laser field, field distribution, spatial distribution, focused laser, laser output

ABSTRACT: The spatial distribution of the electric field set up by a Q-switched, pulsed ruby laser was investigated. The laser consisted of standard ruby crystals 120 mm long and 10 mm in diameter. A spiral IFK-15000 lamp and a Kerr cell were used for pumping and Q-switching, respectively. The laser pulse power output was from several Mw to several tens of Mw. The beam was focused by lenses with f = 45 and 120 mm which were corrected for spherical abberation for λ = 6943 Å. The field distribution was studied photographically, and in the photometric measurements neutral attenuating filters were used. It was shown that the minimum transverse cross section of the focused beam is of the order of several microns and corresponds to

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L 64113-65

ACCESSION NR: AP5021096

2

the diffraction-distributed beam from individual spots which exist in a nonfocused beam at the input lens. The superposition of the individual diffraction patterns generates interference which, in turn, is responsible for a fine structure in the distribution of the focused beam. The results indicate that although by reducing f and increasing the distance between the lens and the laser, higher intensity electrical fields can be attained, the process is limited by the relative aperture of the focusing lens. Further improvement of the field intensity can be achieved by r reducing the number of resonator modes. Orig. art. has: 2 figures. [YK]

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSSR) 44

SUBMITTED: 21Feb65 ENCL: 00 SUB CODE: EC

NO REF SOV: 002 OTHER: 001 ATD PRESS: 4070

Card 2/2

L 1413-66 EWT(1)/ETC/EPF(n)-2/EPA(w)-2/EWG(m), IJP(c) AT

ACCESSION NR: AP5021572 UR/0286/65/000/013/0045/0046
621.039.643

AUTHOR: Askar'yan, G. A.; Delone, N. B.; Rabinovich, M. S. 54 B

TITLE: A method of filling magnetic traps with a hot plasma. Class 21, No. 172411

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 13, 1965, 45-46

TOPIC TAGS: laser, plasma, magnetic trap

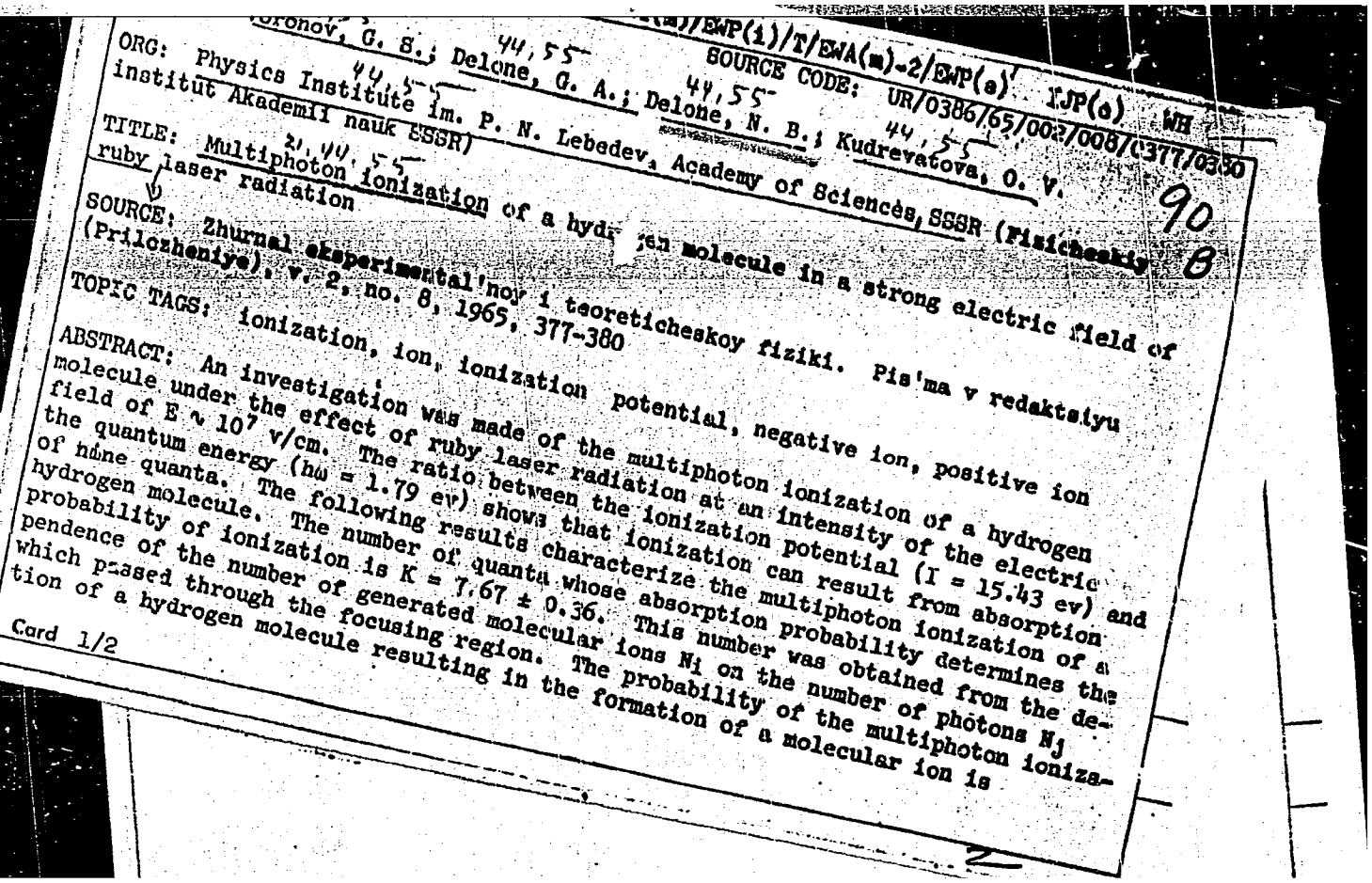
ABSTRACT: The ionization and heating of a portion of matter in the focus of the laser takes place in the magnetic field of the trap formed by fast ions produced in gas-dynamic scattering of the plasma. By increasing the effectiveness of the interaction of ions accelerated by electron pressure, the effectiveness of the laser for obtaining the synthesis of high-temperature plasma is increased. [ZL]

ASSOCIATION: none

SUBMITTED: 26Sep63 ENCL: 00 SUB CODE: EM, EC

NO REF SOV: 000 OTHER: 000 ATD PRESS: 4048

Card 1/1 DP



Voronov, G. S.; Delone, G. A.; Delone, N. B.; Kudrevatova, O. V. 44,55

ORG: Physics Institute im. P. N. Lebedev Academy of Sciences, SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Multiphoton ionization of a hydrogen molecule in a strong electric field of ruby laser radiation

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu (Prilozheniye), v. 2, no. 8, 1965, 377-380

TOPIC TAGS: ionization, ion, ionization potential, negative ion, positive ion

ABSTRACT: An investigation was made of the multiphoton ionization of a hydrogen molecule under the effect of ruby laser radiation at an intensity of the electric field of E ~ 10^7 v/cm. The ratio between the ionization potential (I = 15.43 ev) and the quantum energy ($\hbar\omega$ = 1.79 ev) shows that ionization can result from absorption of nine quanta. The following results characterize the multiphoton ionization of a hydrogen molecule. The number of quanta whose absorption probability determines the probability of ionization is K = 7.67 ± 0.36. This number was obtained from the dependence of the number of generated molecular ions N_i on the number of photons N_j which passed through the focusing region. The probability of the multiphoton ionization of a hydrogen molecule resulting in the formation of a molecular ion is

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L 6256-66

ACC NR: AP5028018

W = $10^{6.3\pm1.5}$ sec^{-1} at a field intensity E = (1.1 ± 0.3) x 10^7 v/cm (photon flux F = $10^{30.0 \pm 0.2}$ $cm^{-2} \cdot sec^{-1}$). A probability of absorption of less than nine quanta determines the probability of ionization of a hydrogen molecule. Calculations based on the theory of multiphoton ionization of atoms when applied to a hydrogen molecule show that the experimentally observed probability W = $10^{6.3}$ sec^{-1} of an eight-photon process can take place in an electric field with an intensity of E = 8.5 x 10^7 v/cm, which exceeds the experimental value of E = 1.1 x 10^7 v/cm. In a strong field both the molecular ions H_2^+ and the atomic ions H^+ are generated. At a field intensity of E = 1.2 x 10^7 v/cm the ratio of the generated ions is 10 ≤ $N(H_2^+)/N(H^+)$ ≤ 100. Atomic ions can be generated by dissociating a molecule with the subsequent ionization of neutral atoms or by ionizing a molecule followed by dissociation of a molecular ion. Orig. art. has: 2 figures. [JA]

SUB CODE: NP/ SUBM DATE: 27Aug65/ ORIG REF: 003/ ATD PRESS: 4143

Card 2/2 RDS

ACC NR: AP6000952 SOURCE CODE: UR/0286/65/000/022/0039/0039

AUTHORS: Galanin, M. D.; Gorbunkov, V. M.; Delone, N. B.; Korobkin, V. V.; Leontovich, A. M.; Saitov, I. S.

ORG: none

TITLE: A method for illuminating particle tracks in chambers for the visual observation of tracks. Class 21, No. 176332

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 22, 1965, 39

TOPIC TAGS: laser, particle track, coherent light

ABSTRACT: This Author Certificate presents a method for illuminating the particle tracks in chambers for visual observation of tracks by pulsed light radiation. To increase the accuracy of the physical experiment, an optical quantum generator (laser) with confocal resonators is used for illuminating.

SUB CODE: 14/ SUBM DATE: 18Jun64

Card 1/1 HW

UDC: 621.375.8:539.1.073.8

VORONOV, G.S.; DELONE, G.A.; DELONE, N.B.; KUDREVATOVA, O.V.

Multiphoton ionization of the hydrogen molecule in a strong electric field of radiation of a ruby laser. Pis'. v red. Zhur. eksper. i teoret. fiz. 2 no.8:377-380 O '65.

(MIRA 18:12)

1. Fizicheskiy institut imeni P.N. Lebedeva AN SSSR.
Submitted August 27, 1965.

L 21513-66 EWT(1)/EWP(e)/EWT(m) JD/AT/WH

ACC NR: AP6004923 SOURCE CODE: UR/0056/66/050/001/0078/0084

AUTHOR: Voronov, G. S.; Delone, N. B.

ORG: none

TITLE: Multiphoton ionization of xenon atoms by radiation from a ruby laser

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 50, no. 1, 1966, 78-84

TOPIC TAGS: laser, ruby laser, xenon, ionization, nonlinear optics, photoionization, photoabsorption

ABSTRACT: Multiphoton ionization of xenon by a focused beam of light from a Q-switched ruby laser was experimentally investigated. Comparison of the ionization potential of xenon (12.13 ev) with the energy of the photons from the ruby laser ($h\nu$ = 1.79 ev) indicates that the absorption of seven photons should be required for ionization. However, for the pulse duration of $\sim 10^{-8}$ sec and the electric field in the laser beam of $\sim 10^{7}$ v/cm achieved in the experiments, the number of photons absorbed per ionized atom of xenon was determined to be 6.23. The discrepancy was attributed to the effect of the strong electric field on the upper energy levels of the xenon atom. The higher the energy level, the closer the levels and the greater the Stark shifts. When the shifts are of the order of magnitude of the distance between the levels, transitions take place between the levels and the levels broaden, forming an almost continuous spectrum adjacent to that of the free electrons. After

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L 21513-66
ACC NR: AP6004923

a sufficiently long time, an electron will make a transition into the continuum. The probability of such a transition is of the order of unity. The experimentally obtained dependence of the field strength on the probability of ionization by a six-photon process is of the same order of magnitude as that predicted by the multiphoton ionization theory of L. V. Keldysh (ZhETF, v. 47, 196[illegible], p. 1945). A numerical calculation based on the perturbation theory, in which resonance levels in the xenon spectrum are taken into account, yields a similar value for the ionization probability. Orig. art. has: 3 figures and 3 formulas.

[CS]

SUB CODE: 20/ SUBM DATE: 27Aug65/ ORIG REF: 006/ OTH REF: 002/ ATD PRESS: 4222

Card 2/2 dla

L 30390-66 EEC(k)-2/EWP(k)/EWT(1)/EWT(m)/FBD/T/EWP(t)/ETI IJP(c) AT/WH/WG/JD
ACC NR: AP6020794 SOURCE CODE: UR/0386/66/003/012/0480/0483

AUTHOR: Voronov, G. S.; Delone, G. A.; Delone, N. B.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Multiphoton ionization of krypton and argon by ruby laser radiation

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 12, 1966, 480-483

TOPIC TAGS: krypton, argon, xenon, laser application, gas ionization, ionization cross section, RUBY LASER, LASER RADIATION, ELECTRIC FIELD

ABSTRACT: The authors observed multiphoton ionization of krypton and argon atoms by ruby-laser radiation at an electric field intensity ~10^7 v/cm, and compared the ratios of the ion signals of krypton and argon with those of xenon, for which measurements of the ionization probability were made by them earlier (ZhETF v. 50, 78, 1966). The experimental setup was similar to that previously used for observation of the multiphoton ionization of xenon (also reported in Pis'ma ZhETF v. 1, no. 2, 42, 1965) and the hydrogen molecule (ibid. v. 2, 377, 1965). The measurements were made at pressures 10^{-5} - 10^{-4} mm Hg. The produced ions were

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analyzed with a time-of-flight spectrometer and registered with an electron multiplier. The multiphoton ionization probability ratios obtained from the experimental ratios were found to be $10^{-0.87 \pm 0.1}$ and $10^{-2.06 \pm 0.5}$ for Kr/Xe and Ar/Xe respectively, as against $10^{-0.83 \pm 0.1}$ and $10^{-2.37 \pm 0.3}$ obtained for the ratio of the ion signals. The results are compared with the predictions of the theory of L. V. Keldysh (ZhETF v. 47, 1945, 1964) and with the perturbation-theory calculations of A. Gold and B. Bebb (Phys. Rev. Lett. v. 14, 60, 1965 and Phys. Rev., in press) and the differences in the results are discussed. The authors thank A. A. Grachev, S. A. Ob"yedkov, and V. P. Solov'yev for help, and L. V. Keldysh and M. S. Rabinovich for valuable discussions. Orig. art. has: 3 formulas and 1 table.

SUB CODE: 20/ SUBM DATE: 15Apr66/ ORIG REF: 005/ OTH REF: 003/ [02]
ATD PRESS: 5017

ACC NR: AP7003207 SOURCE CODE: UR/0056/66/051/006/1660/1664

AUTHOR: Voronov, G. S.; Delone, G. A.; Delone, N. B.

ORG: Physics Institute im. P. N. Lebedev of the Academy of Sciences SSSR

TITLE: Multiphoton ionization of atoms. II. Ionization of krypton by means of ruby laser emission

SOURCE: Zh eksper i teor fiz, v. 51, no. 6, 1966, 1660-1664

TOPIC TAGS: gas ionization, ruby laser, laser application

ABSTRACT: An experimental investigation was made of the multiphoton ionization of the krypton atom (J = 13.996 ev) with the aid of ruby laser emission ($\hbar\omega$ = 1.785 ev). The ionization probability and the dependence of the probability on the photon flux was measured for $F \gtrsim 10^{31}$ $cm^{-2} \cdot sec^{-1}$, which corresponds to an electric field strength of $E \sim 3 \times 10^7$ v/cm. The emission of a powerful laser was focused on a vacuum chamber filled with krypton at a pressure of 10^{-4} mm Hg when the mean free path ($\sim$40 cm) and the time between the collisions ($\sim 10^{-3}$ sec) were several orders larger than the size of the focusing region ($\sim 10^{-2}$ cm) and the duration of the pulse emission ($\sim 10^{-8}$ sec). Thus, the ionization was the result of the direct effect of emission on the separate atoms. The mean free path of electrons with an energy of $\sim$1 ev in the plasma with a density of $\sim 10^{12}$ cm^{-3},

Card 1/2 UDC: none

ACC NR: AP7003207

generated in the focusing region (assuming 100 percent ionization) was 1 cm. This was much greater than the size of the focusing region ($\sim 10^{-2}$ cm), demonstrating that in the ionization region no electron-ion collisions were present. The dependence of the ionization probability on the photon flux was found to be $K \approx \langle J/\hbar\omega + 1\rangle - 2$. The ionization probability observed experimentally was higher than the calculated probability of the transitions in the virtual levels of the continuous spectrum. This apparently is linked with the contribution of the transitions in the bound states. The comparison of the experimental and theoretical results indicates that transitions in the bound states contribute appreciably to the ionization probability and that the effect of the radiation field on these states is considerable. The authors thank V. Berezkin, A. A. Grachev, and S. A. Ob'yedkov for their help in the experiment and Professors L. V. Keldysh and M. S. Rabinovich for discussing the results.
Orig. art. has: 1 figure and 2 tables.

SUB CODE: 20/ SUBM DATE: 14Jul66/ ORIG REF: 006/ OTH REF: 003/
ATD PRESS: 5113

Card

L 14278-66 EWT(1)/FS(v)-3 SCTB DD/RD
ACC NR: AT6003863 SOURCE CODE: UR/2865/65/004/000/0304/0307

AUTHOR: Delone, N. L.

ORG: none

36
B+1

TITLE: Utilization of higher plants as indicators in studying the effect of orbital spaceflight factors on the living cell 2,44

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy kosmicheskoy biologii, v. 4, 1965, 304-307

TOPIC TAGS: radiation plant effect, biosensor, space biologic experiment, cytology, plant sensitivity, plant growth, plant genetics, genetics, closed ecology system

ABSTRACT: Since physical dosimeters can never replace biological ones, a search has been made for plants which would best serve the purpose of studying the effects of spaceflight factors on the living cell. The criteria for evaluating the effects of spaceflight factors on the living cell have been chromosome reconstructions, disruption of mitosis, and disruption of growth processes in the cell. To a large degree, cytological methods were used for determining these changes. The chief categories of hereditary changes are point mutations in the genes, chromosome reconstruction, non-disjunction of chromosomes, and non-disjunction of groups of chromosomes. Only

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point mutations cannot be revealed by cytological means. However, genetic methods can be easily used to determine point mutations in such plants as peas, tomatoes, corn, and barley.

It has been found that the dried seeds of a number of higher plants, microspores of Tradescantia paludosa, tissue cultures of horsebean roots and Haploppapus gracilis roots, onion bulbs (Allium capa), and pollen of corn, pine, and Trillium are useful biological dosimeters. Each of these has certain advantages and shortcomings as biodosimeters.

The air-dried seeds of higher plants make a very convenient test object. Genetic effects are reflected in the number of chromosome reconstructions in the cells of sprouting seeds (in mitosis) or in the germ cells (in meiosis). The shortcomings of seeds are that they are not very sensitive and have only a limited application. The microspores of Tradescantia paludosa have the advantage of relatively great sensitivity during the mitotic process. For flights of less than 10 days duration, or if it is possible to fix materials at definite moments in flight, Tradescantia microspores are one of the most useful biological dosimeters.

ACC NR: AT6003863

The dividing cells of a root tip make a convenient biodosimeter, not only because they are sensitive to external factors, but also because they can be conveniently transported in either a liquid or a solid nutrient medium. Chemical substances dissolved in water penetrate the roots very readily. This property makes root tips very convenient for testing various protective substances. Horsebeans (because of their large size) and Haploppapus gracilis (because of its small number of chromosomes) make very convenient root-tip study objects. Onion bulbs because their cells remain in a state of relative rest, are a very convenient test object for prolonged spaceflights. At the same time their cells are more sensitive to external factors than those of dried seeds. Pollen of such plants as corn, Trillium, and pine can be a very convenient test object, not only because it is smaller in size than seeds and thus provides a greater number of sensitive units, but also because it provides a very simple method of cytological analysis. It is felt that plants used so far are only a beginning, and that an ever increasing number of plants will find use as biological dosimeters in future spaceflights. [ATD PRESS: 4091-F]

SUB CODE: 06 / SUBM DATE: none / ORIG REF: 007

Card 3/3

KHVOSTOVA, V.V., DELONE, N.L., SOROKINA, O.N., TRUKOV, V.L., TSELISHCHEV, S.P. CHAYKINA, K.V.

Development of soft wheat seedlings obtained from seeds irradiated with thermal neutrons [with summary in English]. Biofizika 3 no.4:459-465 '56 (MIRA 11:8)

1. Institut biologicheskoy fiziki AN SSSR, Moskva i Laboratoriya biofiziki Moskovskogo ordena Lenina sel'skokhozyaystvennoy akademii im. K.A. Timiryazeva, Moskva.
(PLANTS, EFFECT OF RADIATION ON)
(WHEAT)

DELONE N.L.

ARSHEN'YEVA, M.A.; BEL'GOVSKIY, M.L.; DELONE, N.L.; PETROVA, O.N.; KHVOSTOVA, V.V.; SHAPIRO, N.I.

Radiation genetics. Itogi nauki.Biol.nauki no.1:329-378 '57.
(RADIATION--PHYSIOLOGICAL EFFECT) (GENETICS) (MIRA 11:3)

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Effect of X irradiation and ethylenediaminetetraacotic acid on chromosome breakage in the microspores of Tradescantia paludosa [with summary in English]. Biofizika 3 no.6:717-724 '58. (MIRA 12:1)

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(ROENTGEN RAYS, effects.
on Tradescantia paludosa on chromosome fragmentation in microspores (Rus))
(EDATHAMIL, effects.
same)
(PLANTS,
Tradescantia paludosa, eff. of edathamil & x-rays on chromosome fragmentation in microspores (Rus))
(CELL DIVISION,
eff. of edathamil & x-rays on chromosome fragmentation in microspores of Tradescantia paludosa (Rus))

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TITLE: Combined Effect of Ethylene Diamine Tetraacetic Acid and X-Ray Radiation Upon Microspores of Tradescantia paludosa in the Interphase(Sovmestnoye deystviye etilendiamintetra-uksusnoy kisloty i rentgenovskogo izlucheniya na mikrospory Tradescantia paludosa v interfaze)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 4, pp. 800- 802 (USSR)

ABSTRACT: The combined effect of ionizing radiations and chemical substances often results an inadditive effect on the cell. Samples are given (References 2,5,6). The author used for his experiments the mentioned plant, a Sax clone, in the case of which no reformation of chromosomes takes place. The interphase of the first postmeiotic mitosis in the microspores lasted 7 days at the temperature at which the experiments were carried out (19 - 21°). The effect on the cell was carried out in the previous interphase; the detection of the cases of the reformation of chromosomes was carried out in the metaphase of the same division (figure 1). In the case of effect

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